BULLETIN No. 115

THE FLORA OF BIC AND THE GASPE PENINSULA, QUEBEC

BY

H. J. SCOGGAN

NATIONAL MUSEUM OF CANADA
DEPARTMENT OF RESOURCES AND DEVELOPMENT
OTTAWA
1950

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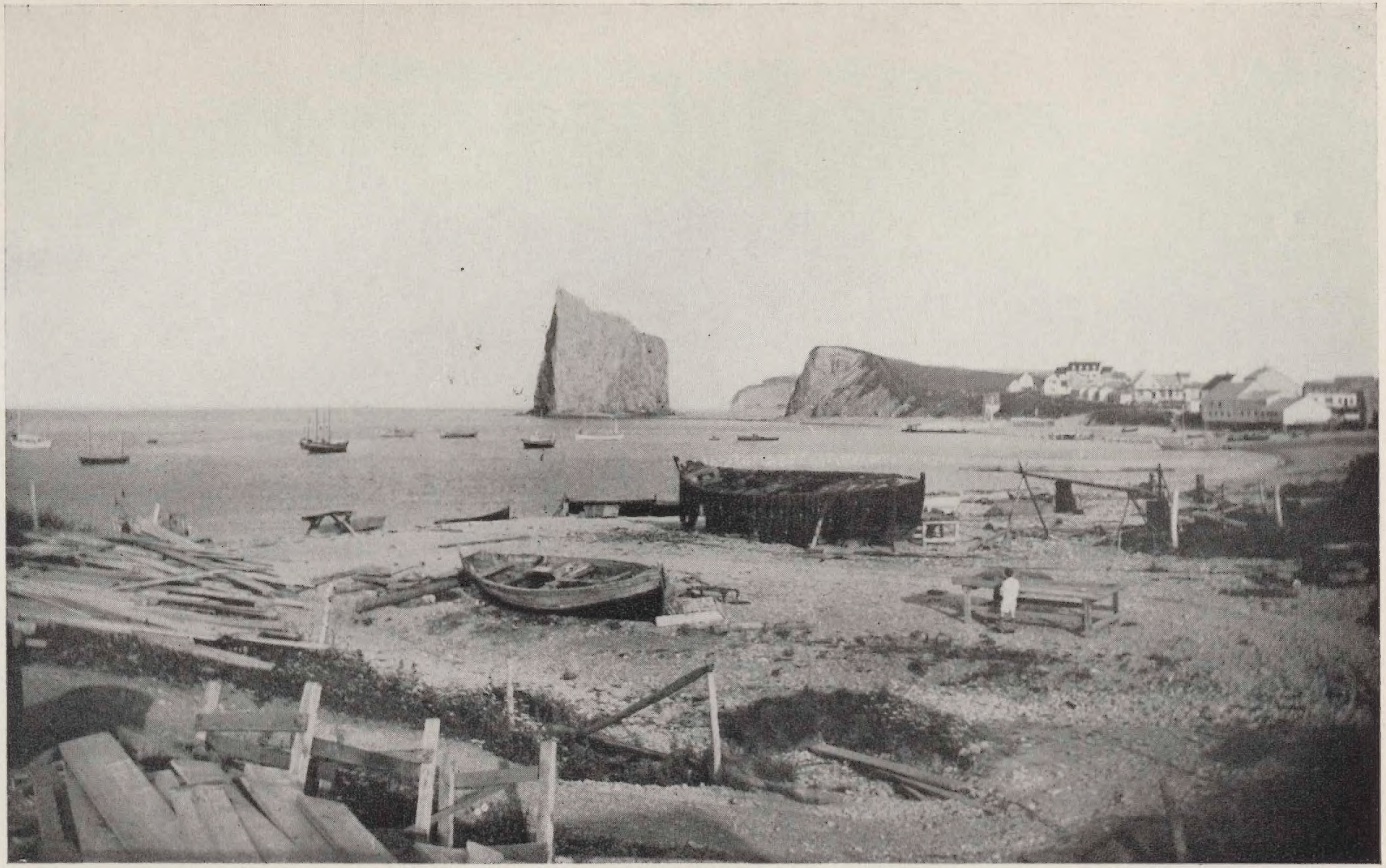

The beach at Percé.

CANADA
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BIOLOGICAL SERIES No. 39

THE FLORA OF BIC AND THE GASPE PENINSULA, QUEBEC

BY

H. J. Scoggan

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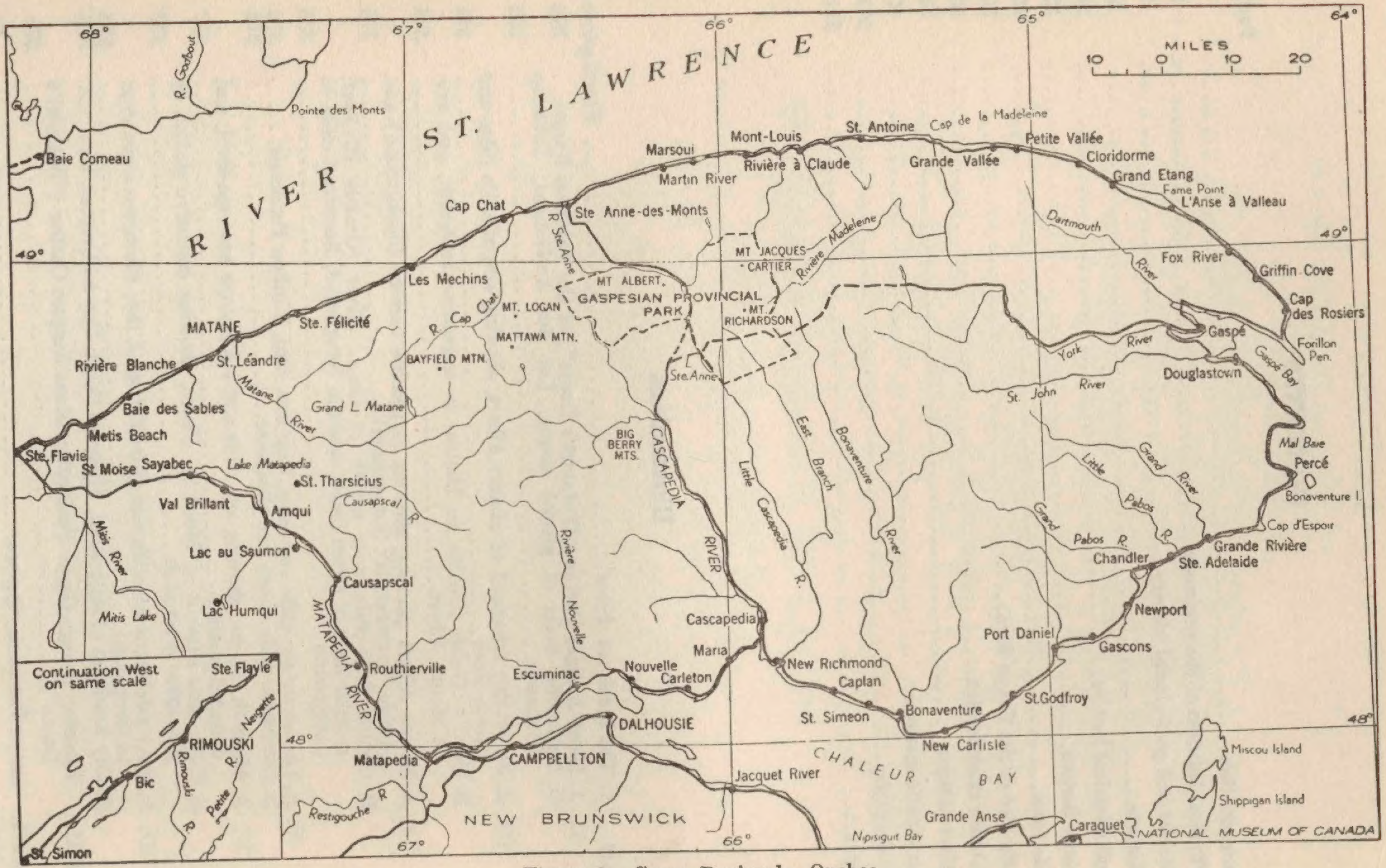

Figure 1. Gaspe Peninsula, Quebec.

THE FLORA OF BIC AND THE GASPE PENINSULA, QUEBEC

INTRODUCTION

The Gaspe Peninsula and the region of Bic, together with adjacent areas of eastern Canada, have long been of particular interest to botanists because of the many interesting problems of distribution presented by various elements of the flora.

The earliest report on the flora is that of John Macoun (1883; *See* Bibliography), based upon his collections of the previous year.

At the beginning of the present century, a series of botanical surveys in eastern Canada and Newfoundland was inaugurated by Professor M. L. Fernald of Harvard University. The outcome was the publication, in 1925, of Fernald's classic phytogeographic study entitled "Persistence of plants in unglaciated areas of boreal America". A complete list of these and later explorations may be found in an appendix to one of Fernald's more recent contributions (1942). Some idea of the extent of Fernald's work in the Bic and Gaspe Peninsula areas may be obtained by pointing out that of nearly 200 types or paratypes of new species, varieties, or forms collected by him and his co-workers in the lower St. Lawrence region of Quebec province between the years 1902 and 1934, 143 were from our area.

Following Fernald's masterly disclosure of the botanical richness of the territory about the Gulf of St. Lawrence, a number of Canadian botanists have also contributed to our increasing knowledge of the flora and its intriguing problems. The late Brother Marie-Victorin, together with other members of the staff of the University of Montreal, collected extensively in Gaspe, as well as in the Mingan Islands, Anticosti Island, the Magdalen Islands, and Newfoundland. Dr. Jacques Rousseau, Director of the Montreal Botanical Garden, has been engaged for many years in botanical surveys of Gaspe and other areas of eastern Canada. Other collectors whose specimens have been made available to the writer, with grateful acknowledgments herewith, include: Mr. Elzéar Campagna, Ecole Supérieure d'Agriculture, Ste. Anne de la Pocatière, Que.; Abbé A. A. DeChamplain, Séminaire de Rimouski, Rimouski, Que.; Abbé Ernest Lepage, Ecole d'Agriculture de Rimouski, Rimouski, Que.; and Mr. A. E. Porsild, Chief Botanist, National Herbarium, National Museum of Canada, Ottawa, Ont. The writer's Gaspe collection, accumulated over a 10-year period (1937-1946), is housed in the National Herbarium.

Professor V. C. Wynne-Edwards, Regius Professor of Natural History at Aberdeen University, also worked in the Gaspe region for many summers while on the staff of McGill University. It was as a student under his direction that the writer first became acquainted with the peculiar nature and challenging problems of the Gaspe flora. For this help, and for many kindnesses extending over the following years, I am most grateful.

I also wish to express my thanks to the following people for valuable suggestions and criticisms: Dr. G. W. Scarth, Professor Emeritus of Botany, McGill University, under whom the writer received his botanical training and whose encouragement during the preparation of this flora has been greatly appreciated; Dr. M. L. Fernald, Fisher Professor Emeritus of Natural History, Harvard University; Mr. A. E. Porsild; Dr. R. D. Gibbs and Dr. N. Polunin, McGill University; Mr. Henry Teuscher, Curator of the Montreal Botanical Garden; Dr. Ernest Rouleau, Curator of the Marie-Victorin Herbarium, University of Montreal; and the late Dr. Lewis L. Reford of Montreal, Que.

PHYSICAL FEATURES OF THE PENINSULA

The Gaspe Peninsula (Figure 1) is that part of the province of Quebec situated between Chaleur Bay to the south and the St. Lawrence River to the north. Considering the valley of Matapedia River as the western boundary, the peninsula has a length of about 150 miles and a maximum width of about 88 miles.

The northern shoreline is very regular, forming a broad arc interrupted only by entering rivers and streams. Gaspe Basin, however, at the eastern tip, is one of the best summer harbours in the world, and the many protected bays and river mouths of the southern coast afford excellent anchorage for the fleets of cod-fishing boats upon which the inhabitants largely depend for a living.

Well-defined terraces containing marine shells are found along the coast and lower parts of the river valleys, of which the most pronounced, the Micmac terrace, with an elevation of about 20 feet, can be traced along nearly the whole north shore. Its absence on the south coast and the fact that the sea is now cutting cliffs there have led Alcock (1926) to believe that there has been some recent sinking along this coastline after the uplift following the disappearance of the Pleistocene ice-sheets.

The Perron Boulevard, in its course along the margins of the peninsula, traverses three distinct physiographic regions. The western section, from Ste. Flavie to Matapedia, winds through Matapedia Valley, whose rolling hills contrast sharply with the flat southern coast along Chaleur Bay. But from Cap des Rosiers (with an isolated region at Percé), the road skirts the St. Lawrence shore through rugged topography whose sea cliffs and headlands provide rich botanizing ground.

The peninsula has two great slopes, the larger descending southward to Chaleur Bay, the smaller northward to the St. Lawrence River. Whereas the botanical interest of the northern and eastern coasts is largely centred in the sea cliffs and rocky headlands, that of the southern coast is centred in the rivers that drain the mountains of the interior and by far the greater part of the peninsula.

The Shickshock (Notre Dame) Mountains of the peninsula form the northernmost region of the Appalachian Mountain system. The highest point, 4,230 feet, is the peak Mont Jacques Cartier (Botanist's Dome) of the Tabletop group (Pl. II A; Pl. VIII). According to Jones (1933), the most abundant rock of the Tabletop batholith is granite, generally pink or red in colour, of medium grain, but ranging from fine to coarse. Spruce, balsam, and birch form the forest cover in the valleys of the mountain system, but above approximately 2,900 feet a dense "krummholz" growth of stunted, interlocking spruce 3 to 7 feet high renders travel extremely difficult except along ridges or cut trails. At still higher levels, as on other Shickshock summits, there occur extensive open areas, with an arctic-alpine vegetation.

A characteristic feature of the Tabletop group is the presence of numerous ponds and lakes, frequently bordered by low cliffs or hummocks of granite, or sometimes by open grassy areas of typical subalpine meadow. A calcareous exposure along the western edge of the group harbours an interesting population of calcicolous plants (Pl. II B).

Southwest of the Tabletop group is Mount Albert, to which the name "tabletop" is much more applicable, because for a length of 3½ miles and a width of 2½ miles the mountain has a plain-like summit varying in elevation from 3,300 to 3,775 feet. The mountain consists of serpentinized peridotite surrounded by dark amphibolite, the broad central plateau presenting a smooth rolling surface (Pl. III A), and possessing an arctic-alpine flora peculiar to itself. It is bare of trees except for a growth of low scrubby spruce on the amphibolite border on the north side (Pl. IV A).

To sum up, an extract may be quoted from Guide Book No. 1 of the Geological Survey, Canada, Department of Mines, 1913: "The interior of this great peninsula is a rolling, heavily timbered wilderness, only the coast region for a maximum width of 10 miles having been opened to settlement. Its geological structure is best exposed in the sea sections, some of which are very striking . . . . Generally speaking, Gaspe is a region of regular appalachian folds and extensive overthrusts of the older Palæozoic strata, the extraordinary displacements in which have been largely concealed by a mantle of later (Devono-Carboniferous) nearly horizontal sandstones and conglomerates. . . . In some degree the bays of to-day (e.g., Gaspe bay, Mal bay) running in from the coast of the Gulf lie in ancient synclines which date back to the later stages of the Devonian. Sea erosion, however, has been so efficient that the lower reaches of the St. Lawrence river which washes the north shore of the peninsula are bounded by a wave cut rock platform in places 8 miles in width, lying at a depth of not more than 300 feet below the present water level . . . . The course of the St. Lawrence river is believed to be determined by a deep thrust fault of the Palæozoics to the south against the crystalline Labrador shield to the north . . . commonly known as Logan's fault".

GLACIAL AND POST-GLACIAL HISTORY

The Shickshock Mountains of the Gaspe Peninsula constitute one of the highland areas of northeastern North America that have been considered on both geological and botanical evidence to have been nunataks during the maximum of Wisconsin glaciation. Other areas claimed by Fernald (1925) on botanical grounds to have served as ice-free refugia in that region include the Torngat and Kaumajet Mountains of Labrador, the Long Range of western Newfoundland, the higher parts of Cape Breton Island, the Magdalen and Mingan Islands, Anticosti Island, the north shore of the Gaspe Peninsula, and the region of Bic, as well as the Bruce and Keweenaw peninsulas and other localities on the upper Great Lakes. The arctic flora of these localities was shown by Fernald to differ from that of the mountains of New England and New York (Fernald's Table I) by possessing, in addition to a usually circumpolar arctic or subarctic element, one whose affinities are essentially American or Sibero-American (Fernald's Table IV). This latter group he termed "cordilleran", because of the relationship of most plants of this group to species of western North America, and their absence from Greenland, northern Europe, and western Asia.

The question of whether or not certain areas within the general southern extension of the Wisconsin ice remained ice-free has been for many years a field of controversy. According to Flint (1943 and 1947), the importance of the Labradorian and Keewatin ice centres has been overemphasized, as these separate centres were confined almost wholly to very late Wisconsin time. He believes that the North American ice mass during the Wisconsin maximum was a continuous sheet comprising only two principal glacial units, namely, a Cordilleran glacier complex, and a much more extensive Laurentide ice-sheet, the latter originating as mountain glaciers chiefly in the highlands of eastern Quebec, Labrador, and Baffin Island. Nourished by moist air derived from the Atlantic, the Gulf of Mexico, and the Pacific, these local glaciers coalesced into piedmont glaciers, continued enrichment of which finally resulted in the burying of the highlands in which they had originated under a vast sheet extending from the Atlantic to the Cordillera. Beyond the southeastern sector of the ice-sheet, the highlands of Newfoundland, Gaspe, and New Brunswick, as well as the White and Adirondack Mountains, developed local glaciers under the influence of the cold climate coupled with exceptional snowfall. The degree to which these coalesced with the encroaching Laurentide sheet at its maximum is of paramount importance in a discussion of the origin of the flora of our area.

According to Coleman (1922), the ice-sheet upon its penetration to the Gaspe Peninsula divided into two lobes, one filling the St. Lawrence channel and impinging upon the north shore, the other following the Matapedia Valley and the basin of Chaleur Bay, the two lobes then meeting and continuing as a single sheet. He considered the interior to have been unglaciated except for local glaciers from the Shickshocks. These may have met and blended with the two lobes of the ice-sheet on its southward passage, but the apparent absence of drift and smoothed, striated, and grooved surfaces led Coleman to believe that the main ice-sheet had not crossed the high plateau country of central Gaspe or the higher headlands of the north coast.

On this basis, Fernald sought to explain the occurrence in Gaspe and neighbouring areas of mixed arctic and cordilleran elements in the alpine flora. Regarding the former, he accepted the classical view that species originally inhabiting the Arctic were driven far southward before the advancing ice-sheet, later returning northward in the wake of the retreating ice (Fernald, 1925, p. 335). Representative colonies, however, were left behind on the higher mountains and in exposed places along the cool shores of the lower St. Lawrence and upper Great Lakes.

The presence of cordilleran species, on the other hand, was claimed by Fernald to be the result of their persistence in those parts that were not crossed by the ice-sheet, either because of high altitude or sheltered lowland position. He, therefore, believed the two groups to have had a common distribution in these isolated areas only in post-Wisconsin times.

Wynne-Edwards (1937), however, has pointed out that the delicate nature of many of the cordilleran species (he cites as examples species of *Woodsia, Carex, Arnica, Anemone parviflora, Castilleja septentrionalis, Galium kamtschaticum, Lonicera involucrata, Veronica alpina* var. *unalascensis*) makes it "very difficult to visualize any of these plants in the heart of a great province of ice, surviving the accidents of many thousands of years". He also notes the significant facts that local floras rich in cordilleran species are also almost invariably rich in species of the arctic group; that the same distributional types (from ubiquitous circumpolar to restricted cordilleran) may be found in both floras; and that the presence of endemic species is characteristic of both groups. Richness in endemics was taken by Fernald to indicate greater antiquity of the group, but, as Wynne-Edwards points out, it is impossible, in view of their stupendous ranges and their Pleistocene history as outlined above, to regard the holarctic flora as post-Wisconsin in origin. He is of the opinion that the two groups have formed a single unit since pre-Wisconsin times.

Recent geological evidence confirms this view. Alcock (1926), at first agreeing with Coleman that the Tabletop and Mount Albert plateaux had not been covered by the Wisconsin ice, reversed this opinion after further field work in the area (1935, 1944). Glacial drift was found up to elevations of 1,800 feet over the whole plateau country north of Chaleur Bay, and a considerable number of well-rounded erratics, some clearly from the Precambrian country north of the St. Lawrence, were found on the highest part of Mount Albert (3,775 feet elevation). The surface configuration also suggested moulding by an ice advance from the north. Because of the extremely active weathering at these altitudes in temperate climates, however, striations had not been preserved.

Flint, Demorest, and Washburn (1942) also interpret the evidence of erratics to indicate that Mount Albert was buried by ice either continental in origin or derived from an ice-cap on the neighbouring Tabletop plateau. Striæ and broad glaciated surfaces were observed up to elevations of 3,500 feet on Tabletop, although subsequent weathering had removed details of glacial polish from the latter. A granite erratic, measuring 7 by 3½ feet, was found on one of the Tabletop peaks at an elevation of about 3,750 feet. Its large size precluded any possibility of transport during the development of a pre-glacial erosion surface, and its firm fresh condition argued against a pre-Wisconsin age. They point out that the close relationship of the frost-weathered mantle to the underlying rocks is strong evidence that downslope distribution of debris has been in operation for only a short time, prior to which any previous accumulation had been removed.

They, as well as Alcock and Wynne-Edwards, believe that the apparently unglaciated character of the Shickshock summits, which are covered with angular blocks of rock corresponding to the bedrock beneath, are due to the combination of bare slopes, isolated hills, crystalline rocks, and temperate latitudes, a combination especially favourable for rapid exfoliation of surface layers following removal of surface debris by glaciation. Similar frost-wedging and mass-wasting have occurred on the summits of the New England mountains, glaciation of which in late Pleistocene times is generally agreed. Wynne-Edwards (1939) has published an interesting photograph of a gully in Frobisher Bay, Baffin Island, whose upper level is covered with a growth of lichens that have not yet had time to establish themselves below the old glacier level. The whole slope, however, is covered with exfoliated fragments of hard gneiss, demonstrating that "the first thing that happens after the retirement of the ice-cap is the almost explosive exfoliation of the surface rock".

Alcock (1935, p. 125) summarizes his concept of the Gaspe glaciation as follows: "In Pleistocene times when the land stood at elevations considerably higher than it does today and when the continental glacier was gathering to the north, the highlands of central New Brunswick and central Gaspe were local centres of glaciation. Ice moved out from the former in a northeast direction to Chaleur Bay region and local glaciers flanked the Shickshocks, moving out both to the north and to the south. Later, when the Labrador ice-sheet had attained sufficient thickness to override the mountains it crossed the whole region, removing the residual soil and leaving the summits denuded to bedrock".

With regard to the Long Range of Newfoundland, MacClintock and Twenhofel (1940) found numerous foreign stones and boulders on Gros Morne, one of the highest peaks, scattered throughout a felsenmeer of sharp fragments of the local quartzite that could have been developed only since glaciation.

Odell (1938) notes that the jagged and broken character of the Torngat and Kaumajet summits, in many cases rising above smoothly moulded lower slopes, has been adduced by earlier observers as evidence that the continental ice-sheet never entirely covered the country. He found evidence of ice-polished rocks, however, at about 4,700 feet on one summit, as well as moutonnée surfaces, and, drawing upon experience acquired in the mountains of Spitsbergen and the high coastal terrain of East Greenland, concluded that the serrated crests were the result of intense frost action in a region of ample moisture-laden winds, following withdrawal of the covering ice.

Of the Bruce Peninsula, Lake Huron, Fernald (1935) writes: " . . . . the highest outcrops of the Niagara escarpment there often display the undenuded and deeply rotted features which seem to indicate that the Wisconsin glaciation left them as nunataks . . . . "; and with reference to the high bluffs and escarpments of the Keweenaw Peninsula, Lake Superior: ". . . . their crests and slopes have, instead (of transported drift), a rotted and angular crust or deeply weathered mantle in situ". Bergquist (1937), however, found evidence of glaciation even in the higher levels, the north slope of West Bluff, Keweenaw Peninsula, being mantled to the very summit with a thin veneer of glacial till containing numerous erratics of rocks foreign to the local area. A road where the glacial drift had been scraped off to expose a narrow strip of bedrock showed a conglomerate pavement carrying numerous glacial striæ and scratches, many of its pebbles and cobbles being sharply planed off.

Greater youth even than the time dating from Wisconsin deglaciation seems to be a characteristic of the habitats of many rare plants. Wynne-Edwards has called attention to the necessity of accepting post-Wisconsin invasion in the case of certain typical cordilleran species such as *Salix vestita, Dryas Drummondii,* and *Anemone multifida,* which are found on Anticosti Island and the Mingan Islands, places buried by the thick ice-sheet, as shown by grooves, striæ, and erratics, as well as submerged under the post-Wisconsin Champlain Sea. Stanley (1937) has shown that the greater part of the present Bruce Peninsula long stood as a series of reefs covered with shallow water whose waves carried away the glacial till and soil, producing ideal conditions for the development of an exfoliated mantle of rock fragments, and Leverett (1929) has shown that practically all of the Keweenaw Peninsula was submerged under the waters of the post-glacial Lake Duluth stage. In view of the glacial history outlined above, post-Wisconsin invasion must also be accepted in the case of the many low-level habitats of rare plants that occur along the north shore of the Gaspe Peninsula and at Bic. The presence of coastal ice-free fringes such as now exist in Greenland would have been impossible, although Abbe (1936) believes that such low-level areas in northern Labrador may have served as refugia for certain species, of which he mentions *Carex filifolia, Cerastium Beeringianum, Senecio pauciflorus, Epilobium Drummondii,* and *Arenaria humifusa.* He notes (1938), however, that Odell's geological observations do not support the idea of ice-free coastal areas.

The alternative would be for the entire flora to have migrated in from the south with the retreat of the ice, favoured by the climatic optimum that is now generally conceded to have followed the Ice Age (*See* Abbe, 1936, p. 135). The present-day gaps in the distribution of such plants as those listed above might then be the result of the subsequent deterioration in climate. The northward migration of the arctic element would, of course, be independent of such a post-glacial warm epoch. Certainly, the less hardy members of the flora can hardly be thought to have migrated from neighbouring elevated nunataks, even if these had existed, which now seems very doubtful. In Labrador, as in Greenland, the high-altitude flora is composed almost exclusively of hardy species of widespread arctic occurrence that are able to survive the severe environment, and have little value as nunatak indicators. True, it is they that would have the greatest chance of survival on nunataks, but they are also the species that would be expected to recolonize the mountain tops in the wake of a retreating ice-sheet.

According to Abbe, the source of the cordilleran element now present in Labrador was probably the group of supposed refugia of the St. Lawrence Gulf region. As the presence of nunataks here, however, is now extremely doubtful, their derivation, as well as that of the disjunct or endemic element of the Gaspe flora, must be sought for still farther south.

Abbe points out that if such a northward migration did occur, it might be expected that representatives of this element would be found in favourable stations scattered within the extensive coniferous forest of the intervening area. Of great significance is a report of Rousseau (1948), following a summer's work in 1947 along George River from its source to its mouth in Ungava Bay, that there occur here, in a morainic region definitely subjected to Wisconsin glaciation, "a great number of species found in the Gaspe region which had heretofore been considered by some botanists as indicators of nunataks".

During recent years there has also been considerable filling in of the large gap in central Canada by virtue of which many species were credited with disjunct ranges. A botanical survey conducted by the writer during the summer of 1948, under the auspices of the National Museum of Canada, in the Norway House-Cross Lake and northern Lake Winnipegosis area of central Manitoba, an area completely submerged under the post-glacial Lake Agassiz, disclosed the presence of a number of plants classed by Fernald (1925, p. 275) as western species centering on the gulf of St. Lawrence. These include: *Carex concinna, Salix myrtillifolia, Arabis Holboellii* var. *Collinsii, Astragalus frigidus* var. *americanus, Arctostaphylos rubra, A. Uva-ursi* var. *adenotricha, Collomia linearis, Euphrasia disjuncta, Rhinanthus Kyrollae, Plantago eriopoda, Erigeron lonchophyllus, Senecio pauciflorus;* and, with stations also in the Great Lakes region: *Juniperus horizontalis, Trisetum spicatum* var. *pilosiglume, Juncus longistylis, Zygadenus elegans, Salix pellita, Geocaulon lividum, Comandra Richardsiana, Rumex occidentalis* (stations also on James Bay, Ont.), *R. triangulivalvis* (Fernald's *R. mexicanus;* stations also on James Bay, Ont.), *R. fueginus, Polygonum achoreum, Arenaria dawsonensis, Ranunculus Macounii, Anemone multifida* var. *hudsoniana, Parnassia parviflora, Rubus acaulis* (transcontinental according to Bailey; station at Churchill, Man.), *Elaeagnus argentea, Vaccinium caespitosum, Halenia deflexa, Hackelia americana, Dracocephalum parviflorum* (station also at Churchill, Man.), *Lonicera involucrata* (stations also on James Bay), *L. villosa* var. *Solonis, Petasites vitifolius, Senecio pauperculus* (station also at Churchill, Man.), *S. pauciflorus,* and *Prenanthes racemosa* (stations also on James Bay).

Lake Agassiz, whose second stage covered almost all of present-day Manitoba, was impounded south of the retreating Laurentide ice-sheet, which at its maximum (*See* Halliday and Brown, 1943, Fig. 1) had extended into northern Montana, South Dakota, northern Nebraska, Iowa, Illinois, Indiana, and Pennsylvania. The present Nelson River drainage system was established after deglaciation of the southwest slope of the Hudson Bay basin permitted discharge over lower slopes than characterized the original southward drainage by the Minnesota River outlet.

Other Gaspe plants listed in Fernald's Table IV, whose ranges (*See* systematic section) have been considerably extended during the last quarter century, include: *Puccinellia paupercula* and its var. *alaskana, Poa eminens, Calamagrostis canadensis* var. *robusta, Carex adusta, C. misandroides, C. Backii, Sisyrinchium montanum, Listera convallarioides, Salix vestita, S. (anglorum) arctica* var. *kophophylla, S. cordifolia* var. *Macounii, S. brachycarpa, S. glaucophylloides, S. laurentiana, S. calcicola, Betula borealis, Arenaria (cylindrocarpa) humifusa, Cerastium Beeringianum, Ranunculus Gmelinii* var. *terrestris (R. Purshii), R. Allenii, Anemone parviflora, Arabis (brachycarpa) divaricarpa, Saxifraga tenuis* var. *nivalis (S. gaspensis), Potentilla pectinata, P. hyparctica* var. *elatior (P. fragiformis), P. Egedii* var. *groenlandica (P. pacifica), Rubus acaulis, Astragalus eucosmus, Hedysarum alpinum* var. *americanum, Osmorhiza obtusa, Pterospora andromedea, Androsace septentrionalis* var. *robusta, Gentiana propinqua, Castilleja septentrionalis (C. pallida* var. *septentrionalis), Galium Brandegeei, Valeriana (sylvatica) septentrionalis, Solidago multiradiata, S. graminifolia* var. *(septentrionalis) major, Erigeron hyssopifolius, E. acris* var. *(oligocephalus) elatus, Antennaria appendiculata, Senecio indecorus,* and *Prenanthes racemosa.*

Attention is also called to the present treatment and ranges of the following Gaspe plants listed in Fernald's Table IV: *Athyrium alpestre* var. *americanum, Pteridium aquilinum* var. *(lanuginosum) latiusculum, Botrychium virginianum* var. *laurentianum, Potamogeton loculosus, Agropyron* *tenerum, Agrostis idahoensis, Eleocharis nitida, Carex Hassei, Sisyrinchium septentrionale, Salix Bebbiana* vars., *Betula microphylla, Stellaria florida, Cerastium Fischerianum, Claytonia caroliniana* var. *sessilifolia, Ranunculus pygmaeus* var. *petiolulatus, Erysimum asperum, Sanguisorba canadensis* var. *latifolia, Astragalus arboriginum, Oxytropis viscida, Epilobium boreale, Cornus canadensis* var. *intermedia, Aster puniceus* vars., *Anaphalis margaritacea* var. *occidentalis, Arnica mollis* and its var. *petiolulatus, Arnica gaspensis, Agoseris gaspensis.* The citing of *Carex scopulorum* as a Gaspe plant was undoubtedly erroneous.

A number of arctic and usually circumpolar species that reach their southern limits in eastern North America chiefly in the St. Lawrence Gulf area are listed in Fernald's Table II. These also were considered to be a more ancient flora here than the type characteristic of the New England mountains. Their occurrence in the Arctic Archipelago was claimed to be the result of their persistence there in extensive unglaciated areas throughout Pleistocene times, along with species of this latter flora. Their occurrence in the St. Lawrence region was attributed to southward migration by way of Labrador "During the long period when glaciation was at its maximum west of Hudson Bay but not yet developed on the Labrador Peninsula" (p. 330). Together with the original flora, these northern emigrants, according to Fernald, "were eliminated from the areas where glaciation was extreme but have persisted in favoured spots which either escaped denudation by the continental and Newfoundland ice-sheets or were only slightly affected by them".

There is a growing opinion, however, that glaciation of the Arctic Archipelago was probably much more extensive than formerly thought. (Compare the following maps: Fernald, 1925, Map 63, p. 325; Antevs, 1929, Fig. 9, p. 653; Halliday and Brown, 1943, Fig. 1, p. 356; Flint, 1947, Pl. 3.) Washburn (1947, pp. 57-59) has summarized this evidence, and points out that the widespread post-glacial emergence demonstrable in many places may be the result of isostatic adjustment following removal of a former ice load. He notes (p. 73) that "Proof of emergence as the result of isostatic adjustment cannot be claimed, however, until more is known concerning possible diastrophic movements unrelated to glaciation of the Arctic Archipelago".

The opinion is now generally held, also, that the Wisconsin glaciation did not develop sequentially from west to east, but that "as Wisconsin drift is present throughout the whole peripheral zone of glaciation from New England to Alberta, the ice sheet appears to have existed contemporaneously throughout more than 2,500 miles" (Flint, 1943, p. 335). There seems little reason to suppose that the glacial history of this group of arctic plants differs from that of the group reaching the New England mountains.

If, then, the entire arctic-alpine flora of our region has had the same history since pre-Wisconsin times, migrating southward, later to return upon the recession of the ice-sheet, to what must we attribute the differences in distribution of various species? Wynne-Edwards (1937) points out that the simple fact emerges that the flora of the arctic and subarctic zones of North America is made up of types that are circumpolar and types that are not circumpolar, and, further, that "Some of these plants have wide limits of climatic tolerance, occurring through a wide latitudinal range, in which case their American distribution takes the form of an arch spanning the continent from the Cordillera to the St. Lawrence by way of the Arctic; while others are more narrowly confined, the hardiest occupying the crown of the arch and least hardy its two ends, whereby their ranges are disrupted into western and eastern centres".

To account for the more or less intense localization of certain species, he points out the very close relationship between these species and the soils or rocks upon which they grow. The great majority are confined wholly or chiefly to calcareous or dolomitic soils, whereas others, such as those of the Mount Albert plateau, are strictly serpentine plants in our area, or, in some cases, also occur on limestones. These rocks are basic in reaction, in contrast with the acidic granites of Tabletop Mountain, which, embracing the highest peaks, should have provided one of the chief refugia in the event of only partial glaciation of the peninsula. Yet, as Wynne-Edwards points out, the rare plants are found only on the basic rocks encircling the granite batholith, the flora of the latter being the common and widespread arctic species characteristic of the glaciated New England mountains. He notes, also, the occurrence of rare "cordilleran" plants in small areas and pockets of calcareous soils in the New England mountains, interspersed within the general area of acidic granites, gneisses, and mica-schists.

Wynne-Edwards sums up his views as follows: " . . . the arctic-alpine flora of eastern North America has formed a single unit since pre-Wisconsin times; that in those times it occupied suitable habitats in latitudes similar to or higher than now; that with the advance of the Wisconsin glaciation it was driven southwards and outwards; and finally with the retreat of the ice a recolonization of suitable habitats took place".

A noteworthy characteristic of the rare limestone floras is their lack of uniformity (*See* Table IX) from station to station throughout the peninsula, in contrast with the more or less uniform old-established flora to be expected on the basis of the nunatak theory. As noted by Wynne-Edwards, this would result from the relatively short time during which recolonization of the scattered stations has been in progress, or, in some cases, from reduction to the last and coolest habitats.

The question of plant competition as applied to the Gaspe flora now raises itself. Of interest at this point is the occurrence of a large Coastal Plain element in the present flora of the Great Lakes. During the Lake Algonquin stage, according to Peattie (1922), when flooding was at a maximum prior to the retreat of the last ice-sheet, the present lakes were all joined by wide connectives and drained into the Champlain Sea. Here, presumably, was a path of migration from the Atlantic Coastal Plain. This is supported by the fact that of those species that extend no farther north than the delta of the Delaware, and so did not attain the New York State connectives with the glacial lakes, none is found around the Great Lakes today.

Peattie is of the opinion that the Coastal Plain types persist there only where those younger and less permanent features of the shore erosion cycle are still to be found, and represent the younger stages of plant succession. Their pioneering quality has allowed the plants to press forward quickly on the unstable margins of these lakes, but where the coastline is fairly stabilized, thickets and forests slowly invade the shores, and they are crowded out. This has happened around Lake Erie, which, although 400 miles nearer the Atlantic than is Lake Michigan, possesses few of these types.

Porsild (1941) reports the presence of twenty-four typical Coastal Plain species in the Ottawa Valley, at a distance of about 30 miles from Ottawa, which are mainly concentrated in depressions of sand dunes of the Champlain Sea period. Here, again, is a flora localized in an area that only in very recent times became available for colonization. Its members are mostly decidedly calciphilous, being replaced by oxylophytes on ridges and level ground where an acid top layer has developed through leaching. Forest fires and shifting sands have reduced competition to a minimum.

Griggs (1940) points out the significant fact, illustrated throughout the systematic section of the present work, that weeds are often found in the same habitats as rare plants. Species of both groups are adapted to survive on the unstable sea cliff and river gravel habitats, but would be crowded out if the erosion cycle was able to reach a stage permitting establishment of the normal forest flora of the region. An interesting analogy is found in the famous series of shale barrens in the Appalachian Mountains, extending from southern Pennsylvania to Virginia and Tennessee. As pointed out by Stebbins (1942), these barrens occur wherever rocks of a certain geological formation outcrop on steep slopes. Each slope is obviously a pioneer habitat, destined to disappear as soil accumulates on it, yet new barrens are constantly being created by weathering and stream erosion. The annual spring flooding, with attendant ice scouring, is effective in maintaining the pioneer nature of the river gravel habitats of Gaspe.

The extreme localization of many of the rare species of eastern North America was interpreted by Fernald as evidence of a state of conservatism, even to the point of senescence, resulting from their great age. If, as Marie-Victorin (1938) suggests, it could be shown with reasonable certainty that these species are disappearing because their great age has resulted in the loss of some mechanism essential for their survival, a new approach would be open to the study of evolutionary problems. When grown in limestone beds at the Montreal Botanical Garden, however, *Aster gaspensis, Cirsium minganense, Arnica lanceolata, Antennaria gaspensis, A. rupicola, Erigeron compositus,* and *Solidago multiradiata* increased their area and thrived vigorously until crowded out by weeds at the termination of the experiment.

The rare plants as a whole appear to be quite as well equipped for seed or spore dispersal as most plants of more widespread occurrence. The minute spores of the rare ferns are as definitely adapted to wind distribution as those of all ferns. The cotton-tufted seeds of the willows and the plumed fruits of *Dryas Drummondii* furnish almost equally good examples. Post-glacial migration is also demanded on geological grounds, as discussed above.

As already noted, the presence of endemics in the arctic-alpine flora of eastern North America offers no positive evidence in support of the nunatak theory. Rather than indicating great age of the flora, Wynne-Edwards believes that this phenomenon can be better correlated with the specialized soil preference of the plants. Their invasion of an area must progress by leaps from one suitable habitat to another, and a station may sometimes be colonized by the progeny of a single seed, an ideal condition for the segregation of different types. Some of the alpine endemics in the genera *Antennaria, Arnica, Draba,* and *Solidago* have, in Wynne-Edwards opinion, this character of neo-endemism (what Wherry (1944) would term primary endemism), and are of recent origin. Older endemics also occur, an expression of the relatively long isolation of the flora as a whole from other arctic-alpine regions. It is pointed out, however, that the ability to split off endemics varies from species to species, and that many northern species have survived relatively unchanged throughout great periods of time.

The probability is, too, that some of the rare species may consist of only one or a few ecotypes, unable to survive except under the peculiar conditions to which they are adapted. The hardships to which they were subjected while being forced southward by the Wisconsin ice-sheet may have substantially depleted the biotype stock, and subsequent inbreeding may in some cases have further sharply defined the species from ancestral types. According to Stebbins (1942), certain biotypes may have been eliminated through combinations of recessive genes expressing themselves phenotypically as non-adaptive characteristics.

The concept has been expressed by Cain (1940) as follows: "The common lack of colonizing ability of the eastern epibiotics would seem to be due to their relatively greater homozygosity and consequent narrower ecological amplitudes; ecological amplitudes which are at one and the same time narrower than those of their western counterparts, and narrower than those of the characteristic dominant acid soil flora of the region . . . . There would seem to be no need of the concept of species senescence. It is replaced by the idea of populations of narrower ecological amplitude because of genetic reasons. Their simpler genetic constitution results from their vegetational history. Their restricted and scattered occurrences result from the restricted and scattered occurrences of habitats which are suitable for such species".

The question of polyploidy in its relation to plant distribution merits some attention. The theory has been advanced that severely cold climates may induce the formation of polyploids. There is evidence to show that, in general, polyploids are more hardy than diploids, and that they are more abundant in high northern regions. There are, however, numerous exceptions. According to Senn (1938), "The Leguminosae then, in general, support neither the concept that polyploids have a wider distribution than diploids, nor the concept that polyploids have a more northern distribution than diploids. Instead the whole situation seems to be more complex, involving the origin of the species in question and its geographic relationships. That is, polyploids in the juvenile endemic stage occupy a small area, which may not as yet reach the boundaries of their specific tolerance. The changes in specific tolerance resulting from polyploidy may enable the plant to live under very different conditions from those in which its diploid ancestor lived. These new conditions are not necessarily linked with greater cold and drought but may run the whole gamut of climatic and edaphic conditions".

It is now well established that amphidiploids (derived through hybridization between two diploid species with doubling of the chromosome number in the sterile hybrid) are generally fully fertile and, moreover, difficult or impossible to cross with their diploid progenitors, any such triploid hybrids being sterile. In this way, a fertile constant species results. Such a species, combining the tolerances and variability of both parents, is able to grow under a greater variety of conditions. Amphidiploids are especially abundant in regions that have been subjected to great climatic or other changes, the diploid progenitors tending to occupy the older, more stable, habitats.

According to Cain (1944, p. 432): "With respect to the effects of glaciation, we may suppose a history somewhat as follows: In the general vicinity of the glacial boundary old diploid species, formerly well isolated, are brought together because of the vicissitudes of forced migrations. In such a region, especially after glacial recession has commenced, there are numerous new, variable, and closely associated habitats in which populations of a variety of species can live in rather close proximity. The result of this intermingling of species may be the production of hybrids, followed sometimes by amphidiploidy. With continued glacial recession, the polyploids and backcrosses are in a position to expand their area tremendously. Some of the diploids also may extend far onto the glacial plain, but most of them will probably have only a limited expansion. The chances of such polyploids spreading into unglaciated territory to any considerable extent seems unlikely because penetration of closed communities is more difficult".

The case of *Iris versicolor,* the present distribution of which is almost entirely within the area of former Wisconsin ice, may be cited as an example. On the basis of present distributions and chromosome numbers, Anderson (1936) believes this species to be an amphidiploid hybrid between *Iris setosa* var. *interior* of central Alaska (large parts of which escaped Pleistocene glaciation) and *Iris virginica* var. *Shrevei* of the Mississippi Valley-Great Lakes region. It follows, in Anderson's opinion, that during the Pleistocene *Iris setosa* var. *interior* was transcontinental in range, probably occupying the moraine of the retreating ice in the northeastern United States, where hybridization with the southern diploid resulted in the origin of the new amphidiploid species, *Iris versicolor,* equipped genetically to occupy rapidly new territory to the north as it became available. The present representative of *Iris setosa* var. *interior* in this area is *I. setosa* var. *canadensis,* so distinct from the original form (perhaps as a result of extreme depauperation of biotype material) as to warrant specific status (*I. Hookeri*). It is isolated by genetic and edaphic barriers from *Iris versicolor,* and the other parent, *Iris virginica* var. *Shrevei,* is isolated geographically to the south.

Similarly, Camp (1944) thinks it likely that *Oxycoccus quadripetalus,* a tetraploid species with a chromosome number of 48, is a derivative of *O. macrocarpus* (ranging southward to Tennessee and North Carolina) and *O. microcarpus* (now confined to northwestern North America and Eurasia), both with a diploid number of 24, during a time when the latter existed along the southeastern margin of the ice-sheet. Camp (1942) has also suggested (although cytological confirmation has not yet been established) that *Vaccinium nubigenum,* an alpine endemic of Gaspe and western Newfoundland, may be an amphidiploid derivative of *V. aoespitosum* and *V. ovalifolium.*

It may be noted that, in Camp's opinion, "east of the Continental Divide, *V. ovalifolium* is a Pleistocene adventive, but with a series of disjunct ("relic") stations the result of post-Wisconsin-times events . . . The viewpoint expressed here is possibly applicable to various species in other groups, primarily western in distribution, which have eastern disjunct outposts. The great series of terminal and recessional moraines with their unassorted and talus-like materials—and at particular stages in the climatic and vegetation succession during each recovery of the floristic mantle—must have been ideal avenues for transcontinental plant migration". In any event, this broad morainic belt would have served as an ideal refugium south of the ice for those rare plants that, even today, are confined chiefly to the unstable sea cliff and river gravel habitats, free from invasion by the forest species that have crowded them out elsewhere.

CLIMATE

The nature of its forest covering places the Gaspe Peninsula close to the region of transition between the northern conifer forest and the hemlock-white pine-northern hardwood forest (Nichols, 1935, fig. 4). The former corresponds closely to the Hudsonian biotic province as bounded by Dice (1943, map 1), and the latter to the Canadian biotic province, but with the difference that Dice has placed the whole of the peninsula in the Canadian. Dice points out that although there is general agreement among biogeographers as to the Eskimoan (Arctic) and Hudsonian divisions, this is not the case for the remaining middle part of eastern North America. The Gaspe Peninsula presents some interesting problems in this connection.

In attempting to explain the biogeographical position of the Gaspe Peninsula, attention must be given to the obvious climatic factors of temperature and precipitation. Table I, assembled from data in the Meteorological Bulletin of the Bureau of Statistics, Quebec, shows the average monthly temperatures over a 10-year period (1934-1943) for the three chief physiographic regions bounding the peninsula (no records are available for the interior).

Column 1: "Gaspésie" (north coast, with stations at Cap Chat, Mont Louis, Cap Madeleine, and Gaspe).

Column 2: "Baie des Chaleurs" (south coast, with stations at Bonaventure and Port Daniel).

Column 3: "Matapédia" (western boundary, with stations at Matapedia and Causapscal).

Column 4: Average monthly temperature of the three regions combined.

The average temperature of Gaspe (37·6) may be compared with those of Montreal (42·4), Quebec (39·0), and Anticosti (35·0) (*See* Marie-Victorin, 1935). A gradual decrease is noted with progress down the St. Lawrence River in the northeasterly direction.

The July isotherm of 63·7 corresponds closely with the 18 degree C. (64·4 degree F.) isotherm that Halliday and Brown (1943, fig. 3) have drawn through the southern part of the peninsula. Actually, isotherms are of very little value in indicating the boundaries of the various biotic provinces. Reference to Dice's map 1 shows that although the boundary between the Eskimoan and Hudsonian provinces corresponds roughly with the July isotherm of 10 degrees C. (50 degrees F.), the southern boundaries of the Hudsonian and Canadian provinces cannot be fitted to isotherms with any reasonable degree of accuracy. The reason is, of course, that the response of vegetation to its external environment is not merely a function of temperature, but also of precipitation and evaporation, for the latter of which very few records have been made. The rate of evaporation determines the effectiveness of precipitation for plant growth, and is in turn dependent upon wind velocity, relative humidity, and temperature.

Table I. Average Monthly Temperatures (Fahrenheit) for the Regions "Gaspésie", "Baie des Chaleurs", "Matapédia", and the Three Regions Combined

—	1	2	3	4
Jan.	12·1	11·5	6·3	9·9
Feb.	13·3	13·1	8·8	11·7
Mar.	22·1	21·8	19·7	21·2
April	34·5	34·5	34·6	34·5
May	45·2	45·7	47·2	46·0
June	55·8	55·7	57·8	56·4
July	63·8	63·9	63·6	63·7
Aug.	61·7	61·2	62·2	61·7
Sept.	53·7	51·4	52·8	52·6
Oct.	42·8	41·8	40·5	41·7
Nov.	30·9	30·6	27·6	29·7
Dec.	18·2	18·2	14·0	16·8
Yearly average	37·8	38·8	36·2	37·6

Table II, again compiled from the Quebec Meteorological Bulletin, shows the average precipitation (in inches) for the same three regions as treated in Table I, the records having been taken for periods ranging from 9 to 37 years. Column 4 shows the average monthly precipitation for the peninsula.

Table II. Average Monthly Precipitation (Inches) for the Regions "Gaspésie", "Baie des Chaleurs", "Matapédia", and the Three Regions Combined

—	1	2	3	4
Jan.	2·56	3·41	2·86	2·93
Feb.	2·40	2·26	2·10	2·25
Mar.	2·69	3·02	2·18	2·63
April	1·99	2·88	1·95	2·27
May	2·55	2·74	2·53	2·60
June	2·94	3·54	3·48	3·32
July	3·05	3·48	3·51	3·34
Aug.	2·79	4·00	3·70	3·49
Sept.	2·43	3·62	3·28	3·25
Oct.	2·87	3·62	3·28	3·25
Nov.	2·43	3·12	3·22	2·92
Dec.	2·64	2·94	2·73	2·77
Monthly average	2·61	3·22	2·87	2·90
Yearly average	31·3	38·6	34·4	34·7

The average annual precipitation of 34·7 inches falls within the 31-40 category of Halliday and Brown (1943, fig. 5). Again, reference to Dice's map 1 (1943) shows that precipitation alone is of little value in delimiting the boundaries of the various biotic provinces of Canada.

As Thornthwaite (1931) states the case, "It is understood that degree of temperature and amount of precipitation and seasonal variations of each are the most important climatic elements, but it has been recognized that the crude measurements of these elements are not satisfactory . . . what appears to be requisite in this general connection is some kind of temperature indices which shall express the temperature values not in ordinary thermometric terms but in terms of the possible *effectiveness* of the observed temperatures in determining the rate of plant growth". With regard to precipitation he says, "The problem of determining the effectiveness of precipitation is rendered complex by the fact that the amount of moisture available for plant growth depends not only upon the amount of rainfall but also upon the loss by evaporation . . ." As early as 1905, Transeau had plotted on a map the ratios obtained by dividing the total annual precipitation by the total annual evaporation for the same station (Thornthwaite's P-E quotient), finding the climatic centres so bounded to correspond in general with the centres of plant distribution.

In order to map climatic provinces that would correspond more closely to observed biotic provinces, Thornthwaite correlated evaporation measurements made at twenty-one stations in the western United States with the corresponding monthly precipitation and mean monthly temperature at the same stations. By so doing, he was able to devise a formula that allowed the computation of the P-E ratio (monthly precipitation divided by monthly evaporation), and hence, the P-E index (sum of the twelve P-E ratios). Plotting the indices on a map, and drawing isopleths, he divided North America into the humidity provinces wet, humid, sub-humid, semi-arid, and arid. Table III shows the P-E ratios for Gaspe derived by the application of Thornthwaite's formula to the monthly temperature and precipitation figures of Tables I and II.

Table III. P-E Ratios and P-E Index for Gaspe

Jan.	1·494	May	0·620	Sept.	0·601
Feb.	0·842	June	0·614	Oct.	0·915
Mar.	1·324	July	0·525	Nov.	1·095
Apr.	0·818	Aug.	0·575	Dec.	1·403
Total					10·826
P-E index					108

The P-E index of 108 places Gaspe in Thornthwaite's humid climatic province.

With the object of expressing the limiting effect of low temperatures and the stimulating effect of high ones with the same coefficients (0 to 128) as the limiting and stimulating effects of deficient and abundant precipitation, Thornthwaite derived by empirical means a formula for the calculation of monthly indices of temperature efficiency (T-E ratio), the summation of these for the 12 months being the temperature efficiency index (T-E index). The equation was constructed so as to give to the northern limits of tundra and tropical rain forest the T-E indices of 0 and 128 respectively.

Table IV shows the T-E ratios and T-E index for the peninsula as a whole, derived by the application of the formula to the data of Tables I and II.

Table IV. T-E Ratios and T-E Index for Gaspe

Jan.	0	May	3·50	Sept.	5·12
Feb.	0	June	6·10	Oct.	2·42
Mar.	0	July	7·92	Nov.	0
Apr.	0·62	Aug.	7·42	Dec.	0
T-E index					33·1

The T-E index of 33·1 would place Gaspe at the northern limit of Thornthwaite's humid microthermal climatic province. Actually, Thornthwaite has placed the northern part of the peninsula in the taiga province, characterized by T-E indices of 16 to 31, whose boundaries in eastern North America closely follow those of the northern conifer forest. The fact is that the climatic zonation of the peninsula is roughly concentric. The peripheral area, with T-E index 33·1, is approaching the limit of adequate temperature efficiency, north of which increased precipitation cannot counteract the detrimental effect of inadequate temperature efficiency on the growth of the broad-leaved trees characteristic of the mesophytic climax forest of the Canadian biotic province. It is doubtless well placed in the taiga climatic province. Arctic tundra conditions are approached upon the unforested summits of the Shickshock Mountains, which make up the central one of the three concentric areas.

Regarding the peripheral area, Dansereau (1943, 1944) points out that the northern hardwoods make up isolated stands, of which the dominant tree is the sugar maple. The beech, a codominant member of the formation to the southwest of our area, is found only in southwestern Gaspe. The red oak is found at Bic, Anse au Griffon, Oakbay, Maria, and Carleton. The American elm occurs in the region of Bic, and along the rivers Claude, Petite Cascapédia, and Matapédia. Dansereau reports that the sugar maple formation forms bands several miles in length at Marsoui, Val d'Espoir, and Maria, and the valleys of the interior and the neighbouring hills up to an altitude of 200 to 600 feet shelter well-developed maple stands. It is to be noted, however, that these formations are habitually protected from the cold winds by a southern exposure or by a line of hills separating them from the sea, and that they are found on relatively gentle slopes, usually less than 40 degrees. He believes that these isolated stations are remnants of a former more widespread deciduous forest of the post-glacial xerothermic period (Raup, 1937; Sears, 1942). This view is supported by the finding of pollen of the hemlock, now apparently absent from Gaspe, at Matamek on the north shore of the Gulf of St. Lawrence, several hundred miles from its present limits. The persistence in Newfoundland of such southern Coastal Range species as *Schizaea pusilla* and *Corema Conradii* (Fernald, 1911) also points to a past climate of more temperate nature, as does the discovery of logs buried in a bog at Blanc Sablon, southern Labrador, some miles from the present edge of the forest. Explained in terms of Thornthwaite's work, it may be that the lowering of the average temperature below the threshold of adequate temperature efficiency has resulted in the replacement of precipitation effectiveness by temperature efficiency as the limiting factor in determining the boundaries between the two forest types. Under normal conditions the succession toward mesophytic conditions would favour the maple-beech formation.

Turning now to the large interior part of the peninsula (except for the higher Shickshocks), it should be noted that Halliday and Brown (1943) have published maps showing the population intensity of various species of the northern conifer forest and the eastern mixed forest. Of the former, the population intensities are as follows: black and white spruce—over 60 per cent in the interior (as in the typical Hudsonian forest), 30 to 60 per cent in the surrounding area; balsam fir—over 30 per cent (as against 1 to 10 per cent in the Hudsonian forest); white birch—10 to 20 per cent in the southern part of the peninsula, 1 to 10 per cent in the northern part (as in the Hudsonian forest); poplar—1 to 10 per cent (as in the Hudsonian forest); Bank's pine—absent from Gaspe, isolated stations at Bic (1 to 20 per cent in the Hudsonian forest).

On the unforested summits of the Shickshocks are found conditions closely approaching those of the arctic tundra or fellfield. A low water-table and the prevalence of drying winds serve further to decrease the precipitation effectiveness, and to cause an approach to the arid arctic conditions (*See* Griggs, 1934). Rocky detritus forms a major part of the surface, and what soil there is is chiefly mineral in nature, with little water-retaining humus. Stone polygons have been seen on Mount Albert and Tabletop Mountain (Coleman, 1922), bearing witness to the violence of heave and throw during the spring and autumn periods of daily freezing and thawing. Many of the plants inhabiting these arid alpine situations have xerophytic adaptations. The tufted cushion-like habit of *Cassiope hypnoides, Silene acaulis, Arenaria* spp., and *Diapensia lapponica,* and the trailing habit of *Salix* spp., *Arctostaphylos alpina, Vaccinium caespitosum,* and *Rhododendron lapponicum* are cases in point. The thick, narrow, rolled leaves of *Loiseleuria procumbens* and *Empetrum nigrum,* and the reduced leaf-size of *Phyllodoce coerulea* and of all the above species are further examples. The grouping of leaves to form a basal rosette closely appressed to the ground is also a protection against the scouring winds, at the same time affording a means of passing the winter buried beneath the snow. *Lychnis alpina, Armeria maritima* var. *labradorica,* and *Solidago multiradiata* are such rosette plants. Even if, as often happens, the summits are laid bare by the winter gales, the advantages of these adaptations are obvious in serving to reduce evaporation to a minimum.

Plants of an arctic-alpine character are not, however, found only on the mountain summits, but also on the sea cliffs and talus slopes of the north coast, and the ledges and gravel beaches and bars of the rivers, especially those draining southward. The fact that these rivers drain the mountains of the interior, upon which snow lies late into the spring and summer or even permanently in the deeper north-facing ravines, is sufficient to explain the arctic-alpine nature of the river gravels, and temperature studies of the waters bathing the north coast help to explain the presence on the sea cliffs and headlands of an arctic-alpine element.

Sandstroem (1919) draws attention to the peculiar behaviour of the St. Lawrence current as it reaches the gulf and mixes with the colder saline water of the Labrador current. This mixing process gives rise to the Gaspe current. The ebb and flow of the tide may be of considerable importance in this regard, as well as the westerly direction of the prevailing winds. In the mixed water of the Gaspe current, the fresh St. Lawrence water, although relatively small in volume, is highly important, for it is this that renders the Gaspe water slightly lighter than the surrounding sea water, giving rise to the solenoid system that forces the Gaspe water out of the gulf and draws in the cold Labrador water. Owing to the earth's rotation the Gaspe current hugs the north coast of the peninsula, rounding Cape Gaspe, and filling the southern part of the gulf. The warm bottom layer of Atlantic water in the gulf is connected with the outer world only by the long deep channel of Cabot Strait.

Tremblay and Lauzier (1940) obtained temperature readings at different depths in the gulf, verifying the presence of a cold layer of water at a depth of 50 to 100 metres, between two layers of water at a higher temperature. The top layer of fresh St. Lawrence River water had a summer temperature of about 20 degrees C.; the cold, middle Labrador water, with a salinity of about 32 to 33 per cent, had a temperature less than 0 degree C.; and the bottom Atlantic water, with a salinity of about 35 per cent, had a temperature near 5 degrees C.

According to Sandstroem, the cold intermediate layer is partly the result of the melting of ice in the gulf, but is chiefly derived from Greenland waters by the combined mechanism of solenoid systems and the earth's rotation. On reaching Cabot Strait, it is forced by the earth's rotation into the gulf, leaving by Cape North at the northern tip of Cape Breton Island or rounding Banquereau. These outward currents are considerably stronger in the spring than in summer, owing to the melting of ice in the gulf.

The level of the cold layer in the gulf is dependent not only on the season, but also on wind direction. With an easterly wind pressing great quantities of warm surface water into the gulf and retarding the exit of St. Lawrence water, corresponding masses of bottom water will be forced out through Cabot Strait, and the level of the cold layer will sink in the gulf and rise outside. With the forcing of surface water out by the prevailing westerly wind, on the other hand, the level of the cold layer is raised inside the gulf and lowered outside.

The lingering of snow until late in the spring beneath the north-facing sea cliffs and in the deep glens and shaded ravines adds to the coolness of the habitat. Also, the absence of extensive flats or sand banks to be heated by the sun's rays during the retreat of the tide is, doubtless, a contributing factor, and the tide itself helps to stir up the cold underlying waters. The warm winds from the neighbouring land coming into contact with the cold waters of the coast, produce the fogs that are so common a feature of the north coast, and contribute further to the low temperatures.

To sum up, the Gaspe Peninsula is a region of transition between the eastern mixed forest and the northern conifer forest, between the Canadian and Hudsonian biotic provinces, and between the humid microthermal and taiga climatic provinces. In addition, elements of tundra vegetation are found on the summits of the higher mountains, and many plants of arctic-alpine character are found near sea-level in cliff and river gravel habitats.

SOIL CHEMICAL FACTORS

Attention has already been drawn to the close relationship that exists between arctic-alpine floras and their substrata. It has been pointed out that the areas formerly cited as refugia for the rare "cordilleran" group are all areas of basic rocks such as limestones, dolomites, basic schists, slates, and sandstone, and basic eruptives such as serpentine, diabase, and basalt. As an example of the soil preferences of arctic-alpine species, three lists are given below of plants occurring in neighbouring unforested areas of the Shickshock summits and slopes.

On the granitic tundra-like tableland of Tabletop Mountain (Pl. II A; Pl. VIII) are found:

Lycopodium Selago
L. annotinum,
  var. *pungens*
Hierochloe alpina
Agrostis borealis
Deschampsia atropurpurea
Carex deflexa
C. Bigelowii
Juncus trifidus
Luzula spicata
L. confusa
Salix Uva-ursi
S. herbacea
Betula glandulosa
Rubus acaulis
Sibbaldia procumbens
Empetrum nigrum
Ledum groenlandicum
Rhododendron lapponicum
Loiseleuria procumbens
Kalmia angustifolia
K. polifolia
Phyllodoce coerulea
Cassiope hypnoides
Andromeda glaucophylla
Chamaedaphne calyculata
Arctostaphylos alpina
Vaccinium uliginosum
V. uliginosum,
  var. *alpinum*
V. Vitis-Idaea, var. *minus*
Diapensia lapponica

These are mostly common plants of circumpolar range in arctic and sub-arctic latitudes, where they grow upon siliceous rocks and soil of acid reaction.

On the calcareous cliffs above Lac des Américains at the western edge of the Tabletop group (Pl. II B) are found the following typical calciphiles:

Cystopteris fragilis
Polystichum Lonchitis
Festuca prolifera
F. brachyphylla
Carex scirpoidea
C. norvegica
C. concinna
C. capillaris
C. atratiformis
Juncus castaneus
J. albescens
Tofieldia glutinosa
Salix vestita
Anemone parviflora
Draba Allenii
Arabis alpina
Saxifraga aizoides
S. oppositifolia
S. Aizoon, var. *neogaea*
S. nivalis, var. *tenuis*
Potentilla nivea
Dryas integrifolia
Primula mistassinica
Pinguicula vulgaris
Senecio pauciflorus

In distribution, these plants are highly varied, 11 being arctic circumpolar, 6 arctic American, 2 disjunct American, 1 local endemic, and the remainder boreal circumpolar or American.

On the serpentine tableland of Mount Albert (Pl. III A) are found:

Adiantum pedatum,
  var. *aleuticum*
Cheilanthes siliquosa
Polystichum scopulinum
Deschampsia caespitosa,
  var. *littoralis*
Danthonia intermedia
Festuca scabrella
Salix brachycarpa
S. hebecarpa
S. chlorolepis
Lychnis alpina
Arenaria humifusa
A. sajanensis
A. marcescens
Armeria maritima,
  var. *labradorica*
Artemisia borealis
Cirsium muticum,
  var. *monticola*
Solidago multiradiata

Of these, 4 are arctic circumpolar, 3 arctic American, 6 disjunct American, and 4 local or gulf endemics. Several of these also occur on limestone outcrops in Gaspe or Newfoundland (*Adiantum pedatum* var. *aleuticum, Arenaria humifusa, A. sajanensis, Artemisia borealis, Solidago multiradiata*). The two types of rock are alike in one significant respect, namely, their basic reaction. It is of interest to note the occurrence of *Adiantum pedatum* var. *aleuticum, Cheilanthes siliquosa* (*Pellaea densa*), and *Festuca scabrella* upon serpentine outcrops in the Quebec counties of Beauce, Megantic, Wolfe, and Richmond (Marie-Victorin, 1935, p. 38).

It is true that certain plants of acid bogs are found on the Mount Albert tableland (*Rubus Chamaemorus, Ledum groenlandicum, Kalmia angustifolia, Chamaedaphne calyculata, Oxycoccus quadripetalus, Lonicera villosa*), but almost entirely in raised bogs where they are removed vertically from the influence of the underlying basic serpentine. *Rhododendron lapponicum, Vaccinium uliginosum* and *Ledum groenlandicum* are dwarfed and of a starved appearance when found on the serpentine, to which they are obviously not well adapted. A higher stage in the succession is the "krummholz", whose dominant member on the mountain summits is *Picea glauca,* the matted, gnarled, often prostrate bodies of which, many dead in whole or in part, form an almost impenetrable tangle. According to Nichols (1918), the dwarfed stature of the trees composing the alpine krummholz is closely correlated with the depth of snow in winter, any branches projecting above the snow being liable to be killed by excessive transpiration or snow-blasting. Individual shoots that survive a few mild winters are killed by a subsequent unusually severe one.

Fernald (1933) explains the presence of oxylophytes on the calcareous rock barrens of the coast of western Newfoundland as follows: "Since the long-weathered superficial soils have, by continuous leaching, lost much of their alkalinity and have developed carpets of ancient acid peats, oxylophytes, such as *Hierochloe alpina, Carex concolor, Juncus trifidus, Salix Uva-ursi, Potentilla tridentata, Empetrum nigrum, Loiseleuria procumbens* and *Diapensia lapponica,* are not excluded". Similarly, to explain the occurrence of many oxylophytes on the boggy summits of the calcareous Mingan Islands, St. John (1922) assumes the summits to have been leached of available lime owing to the nature of the drainage, which is in an outward direction toward the coast, so that the soluble salts are not concentrated near any of these high bogs.

With regard to our area, a certain boggy meadow (Fernald's "calcareous meadow") in a sag near the western edge of Tabletop Mountain receives drainage from different directions off both calcareous and granitic slopes, and was found by Fernald (1907) to contain a mixture of calciphiles and oxylophytes, their distribution being evidently correlated with local differences in composition of the soil solution.

Because of the concentration of rare species in Gaspe not only on the mountain summits but also in the lowland river gravel and sea cliff habitats, the writer has made determinations of pH and available calcium. The results are presented in Tables V and VI.

Table V. Available Calcium and pH Determinations for Gaspe Rivers

Rivers	Ca (ppm)	$(HCO_3)_2$ (ppm)	pH
Bic River	22·4	90·8	7·6
Rimouski River	9·2	36·9	7·1
Matane River	24·4	98·8	7·6
Stream west of Tourelle	25·0	101·2	7·4
Ruisseau Arbour	34·4	139·1	7·6
Rivière à Claude	22·6	91·6	7·4
Rivière à Pierre	27·0	109·4	7·6
Rivière Mont Louis	26·2	106·2	7·6
Dartmouth River	30·8	124·8	7·6
York River	28·6	115·8	8·2
St. John River	37·8	153·4	8·0
Portage River	48·8	198·0	8·0
Grande Rivière	40·2	164·8	8·0
Rivière Petit Pabos	44·8	182·0	8·2
Rivière Bonaventure	40·0	164·4	8·0
Rivière Petite Cascapédia	29·6	120·0	8·2

Table VI. Available Calcium and pH Determinations for Gaspe Sea Cliffs

Sea cliffs and ledges (drip and seepage)	Ca (ppm)	$(HCO_3)_2$ (ppm)	pH
Tourelle	15·6	63·2	7·2
Christie	13·2	53·4	7·4
Ruisseau Sorel	29·0	117·6	7·8
Ruisseau Arbour (ledges 1 mi. W.)	39·2	158·6	8·2
Ruisseau Arbour (ledges ½ mi. W.)	36·6	148·5	8·2
Mont Louis (ledges 1 mi. W.)	41·2	167·0	7·8
Mont St. Pierre (ledges ½ mi. W.)	46·6	188·5	8·2
Mont St. Pierre (cliffs west of bay)	35·2	142·7	8·2
Mont St. Pierre (cliffs east of bay)	80·0	324·0	8·0
Cap Pleureuse	32·8	133·0	8·2
Gros Morne (ledges 1 mi. W.)	31·2	126·1	8·2
Gros Morne (west)	28·4	115·0	8·0
Gros Morne (east)	33·8	137·0	8·0
Mont St. Alban	47·4	192·5	8·0
Cap Bon Ami	60·6	247·2	8·2
Percé (Amphitheatre)	39·6	160·1	8·2
Percé (Grande Coupe)	34·0	138·0	7·6
Percé (sea ledges)	63·8	259·0	8·0

For purposes of comparison, determinations were made in acid areas such as heath bogs and the granitic area of the Laurentian Shield on the north shore of the St. Lawrence River between St. Simeon and Lake St. John. The results are shown in Table VII.

Table VII. Available Calcium and pH Determinations in Acidic Regions

Locality	Ca (ppm)	$(HCO_3)_2$ (ppm)	pH
Rivière du Loup, heath bog N.	11·6	47·0	4·4
Rivière du Loup, heath bog S.	22·4	90·6	4·6
Rivière du Loup, ditch in bog	0·6	2·4	4·2
Cacouna, heath bog	1·6	6·5	4·2
St. Fabien, heath bog	2·6	10·8	3·8
Rivière Noire, near St. Simeon	23·4	94·7	6·6
Lake 10 mi. E. of St. Simeon	4·2	17·0	6·6
Lake 8 mi. E. of St. Simeon	4·4	17·8	6·6
Lake 4 mi. E. of St. Simeon	9·0	36·4	6·8
Lake 2 mi. E. of St. Simeon	4·2	17·0	6·6
Lake 15 mi. N. of Baie St. Paul	6·0	24·4	6·6
Lake 45 mi. S. of Bagotville	2·6	10·5	6·0
Lac Ha-Ha marsh, S. of Bagotville	6·8	27·6	5·6
Stream 40 mi. S. of Bagotville	3·4	13·8	6·4
Stream 25 mi. S. of Bagotville	3·2	13·0	6·4
Rivière Peribonka	2·6	10·5	6·6
Rivière Mistassini	5·0	20·2	6·6
Lac St. Jean waters, at Pointe Bleue	4·8	19·5	6·6

Comparing Tables V and VI with Table VII will show that the river gravel and sea cliff habitats are invariably relatively high in available calcium and well on the alkaline side of neutrality, whereas the waters of granitic areas are low in available calcium and on the acid side of neutrality. The soil solution of heath bogs is, of course, highly acid.

Table VIII presents data from other calcareous areas.

Table VIII. Available Calcium and pH Determinations of Calcareous Regions of Bic and Gaspe other than Rivers and Sea Cliffs

Locality	Ca (ppm)	$(HCO_3)_2$ (ppm)	pH
Bic (pond, Anse au Flacon)	26·8	107·8	8·2
Bic (pond, Lac Porc-Epic)	23·8	96·5	8·2
Bic (pond with *Nymphaea tetragona*)	35·4	143·5	8·2
Bic (ditch draining cedar swamp)	23·0	93·2	7·4
Bic (pool in cedar swamp)	78·6	318·0	7·2
Bic (seepage, south foot of Bic Mt.)	71·4	289·0	7·8
Bic (spring, north foot of Bic Mt.)	18·8	76·1	7·0
Lac Pleureuse (lake water)	18·2	73·6	7·2
Lac Pleureuse (cliffs above lake)	43·8	177·5	8·2
Grand Etang (pond water)	35·4	143·2	7·2
Percé (La Coulée streamlet)	52·8	214·0	8·2

BIOTIC FACTORS

In contrast with such external features of the environment as glaciation, climate, and soil, some attention will be given here to those factors affecting plant distribution as a result of competition between plant species, or as a result of physiological, genetic, or structural peculiarities.

As already mentioned, most of the rare plants of Gaspe occur in the lowland calcareous habitats of sea cliffs and river gravels and ledges. In order to gain further information on their type of distribution, ten typical sea cliff stations and ten typical river stations have been selected, and the presence or absence of 125 of the definitely calciphilous species (indicated in the systematic part of this work as calcicoles) has been determined.

The ten sea cliff stations are: Bic, Grosses Roches, Tourelle, Ruisseau Sorel, Mont St. Pierre, Cap Pleureuse, Gros Morne, Mont St. Alban (near Cap des Rosiers), the Forillon Peninsula (terminated by Cap Gaspé), and Percé (including Bonaventure Island). The ten river stations are along the rivers Matane, Ste. Anne des Monts, Dartmouth-York-St. John system, Renard (Fox River), Grande (Grande-Rivière), Petit Pabos, Bonaventure, Petite Cascapédia, Grande Cascapédia, and Matapédia. The results are shown in Table IX, the plants being grouped into classes I, II, III, IV, and V as they occur in up to 2, 4, 6, 8, or 10 of the stations (column "*a*", sea cliffs; column "*b*", river gravels and ledges), or in up to 4, 8, 12, 16, or 20 of the twenty stations (column "*c*"). Figures in the left hand side of each column indicate number of species, percentages being given at the right.

Table IX. Occurrence of Calciphilous Species in Selected Stations
(Explanation in text)

Class	*a*		*b*		*c*	
		Per cent		Per cent		Per cent
I	50	45·9	30	37·5	64	51·2
II	29	26·6	20	25·0	37	29·6
III	22	20·2	17	21·3	19	15·2
IV	7	6·4	10	12·5	5	4·0
V	1	0·9	3	3·7	0	0·0
Total	109 species		80 species		125 species	

The striking feature shown by Table IX is the lack of uniformity of the isolated limestone floras. Almost half of the 109 sea cliff calciphiles are found in only one or two of the ten typical stations, over a third of the 80 river gravel calciphiles are found in only one or two of the ten stations, and over half of the 125 species are found in only one to four of the total twenty stations. An interesting contrast is presented by the species of such a highly developed community as a heath bog, in which the ground coverage is practically 100 per cent. Competition is at a maximum, and the composition of the plant association has reached an equilibrium at about the same number and kind of species for all such habitats of temperate eastern North America. This is aided by the fact that bog species are tolerant of the extremely acid reaction and toxic properties of the substratum, which discourage invasion by species not so adapted.

A very characteristic feature of the sea cliff and river gravel habitats is the instability of the substratum. Plate IV B shows a typical river gravel station located a short distance above the mouth of Grande Rivière. As shown here in summer, the river is narrow and shallow, occupying a small part of the flood-plain. With the spring thaws, it becomes a turbulent ice-laden flood, rising several feet, and subjecting its ledges, beaches, and bars to violent buffeting and ice scouring. This, together with the unstable nature of the gravel and cobble rooting medium, and the low temperature of the water, effectively reduces competition by forest species. Among the interesting plants of this station are:

Woodsia glabella
Poa alpina
Carex Garberi, var. *bifaria*
C. atratiformis
C. scirpoidea
C. eburnea
C. concinna
C. capillaris
Tofieldia glutinosa
Zygadenus glaucus
Allium Schoenoprasum, var. *sibiricum*
Polygonum viviparum
Thalictrum alpinum
Anemone parviflora
A. multifida, var. *hudsoniana*
A. riparia
Draba arabisans
Crataegus Brunetiana
Amelanchier gaspensis
A. Fernaldii
Prunus pumila, var. *depressa*
Dryas Drummondii
Oxytropis johannensis
Hedysarum alpinum, var. *americanum*
Viola nephrophylla
Primula mistassinica
Castilleja septentrionalis
Viburnum edule
Pinguicula vulgaris
Valeriana septentrionalis
Lobelia Kalmii
Aster gaspensis
Erigeron hyssopifolius
Antennaria gaspensis
Arnica chionopappa
Taraxacum ceratophorum

Evidence of reduced competition is shown by the circular outline of the mats of *Dryas Drummondii* in the foreground, and the "open" nature of the flood-plain.

As an example of a typical sea cliff station may be taken that at Cap Bon Ami on the north side of the Forillon Peninsula. Plate V A shows the extremely unstable nature of the habitat. The stratified limestone rocks weather rapidly under the action of frost and the solvent properties of rain water, producing sharply cut cliffs with talus slopes at their base. They are still in the earliest stages of the erosion cycle, and the rock crevices and talus slopes are still open to further colonization by species able to endure the shifting and often very arid conditions encountered here, conditions that at the same time discourage encroachment by the normal mesophytic flora.

The following calciphilous plants are found at this station and at similar ones in the immediate neighbourhood:

Cryptogramma Stelleri
Asplenium viride
Polystichum Lonchitis
Dryopteris Filix-mas
Cystopteris bulbifera
C. fragilis
Botrychium Lunaria
Trisetum spicatum, var. *pilosiglume*
Poa glauca
P. alpina
Festuca saximontana
Carex aurea
C. atratiformis
C. scirpoidea
C. eburnea
C. concinna
C. capillaris
Cypripedium Calceolus, var. *parviflorum*
Polygonum viviparum
Arenaria rubella
Cerastium Beeringianum
C. Beeringianum, var. *grandiflorum*
Anemone parviflora
A. multifida, var. *hudsoniana*
A. riparia
Draba incana
D. arabisans
D. lanceolata

D. pycnosperma
D. Peasei
Erysimum coarctatum
Arabis Holboellii
A. hirsuta, var. *pycnocarpa*
Saxifraga aizoides
S. Aizoon, var. *neogaea*
S. cernua, forma *latibracteata*
S. caespitosa
Parnassia parviflora
Amelanchier gaspensis
A. Fernaldii
Potentilla nivea
P. pectinata
P. norvegica, var. *hirsuta*
Dryas Drummondii
Hedysarum alpinum,
  var. *americanum*
Viola adunca, var. *minor*
Primula laurentiana
Androsace septentrionalis
Hackelia deflexa, var. *americana*
Euphrasia arctica
E. canadensis
Viburnum edule
Solidago multiradiata
Erigeron compositus
Antennaria gaspensis
Artemisia canadensis
Arnica chionopappa
Senecio aureus
S. pauperculus

The Mont St. Pierre station (Plate VI A) deserves special mention here. Along the sea cliffs and talus slopes at its base are found many of the calciphiles already listed, as well as others. On the calcareous sandstones of the denuded slopes at the summit (Plate VI B) are found:

Botrychium Lunaria
Anemone multifida,
  var. *hudsoniana*
Draba lanceolata
D. arabisans
Prunus pumila, var. *depressa*
Astragalus scrupulicola
Oxytropis gaspensis
Elaeagnus commutata
Erigeron compositus
Artemisia canadensis
Senecio pauperculus

The *Astragalus* and *Oxytropis* are known only from this station or neighbouring Mont Louis. On the sea cliffs of nearby Cap Pleureuse are found *Oxytropis foliolosa* and *Gentiana propinqua*, at their only known station south of Labrador; and the limestone cliffs above Lac Pleureuse (Pl. V B) harbour the very rare *Carex misandroides*.

Griggs (1934) believes that the confusion that results from attempts to describe arctic vegetation in terms of well-marked associations is due to the relative freedom from competition. The final product is "a bewildering mixture of plants of all sorts jumbled together in seeming defiance of the principles of plant association learned in low latitudes".

Polunin (1939) states that about three-quarters of the native British vascular plants that reach arctic latitudes grow chiefly in the absence of competition, being rare alpines of rock crevices or other "open" habitats.

The data of Table IX, and an examination of the photographs, seem to indicate that very similar conditions prevail in the sea cliff and river gravel habitats of Gaspe. With regard to the alpine habitat, reference to Plate III A will show what might easily be mistaken for typical open arctic fellfield. Factors contributing to reduced competition are low temperatures, scouring and desiccating winds, low water-table, low humus content of the scanty soil, and, to some extent, frost-churning, as stone polygons have been observed on both Mount Albert and Tabletop Mountain.

LIFE FORM

Life form classification is founded on the adaptive features of plants that enable them to live through the unfavourable season, and is based on the position of the perennating buds with respect to the substratum.

Its underlying aim is to express the relation between climate and vegetation. The plants of our region fall into the following life form classes:

(1) Phanerophytes (Ph): buds aerial, at least 25 cm. above the ground; includes trees and most shrubs.
(2) Chamaephytes (Ch): buds above the ground, but not more than 25 cm.
(3) Hemicryptophytes (H): buds at soil level.
(4) Cryptophytes (Cr): buds buried in the soil or under water.
  (a) Geophytes (G): buds buried in the soil.
  (b) Helophytes (Hel): buds under water, leaves and floral shoots above.
  (c) Hydrophytes (HH): whole plant immersed.
(5) Therophytes (T): annuals, passing the winter in seed form.

Jones (1936) points out that shrubs and trees, because of their height above the ground, are subjected to a wider range of conditions than smaller plants. They, therefore, stand as the most complete summation that can be attained of the natural environment of any area. Their absence is a characteristic of tundra and arctic-alpine vegetation.

The chamaephyte life form is in particular harmony with arctic and alpine climates, whose cold desiccating winds eliminate phanerophytes, and whose frozen soil prevents deep root penetration. The hibernating buds are protected on the soil surface by the long winter snows. Cushion and mat-forming plants are especially characteristic. Chamaephytes may be subdivided into *semi-shrubby chamaephytes* (possessing upright shoots that die back nearly to the surface of the ground during the unfavourable season); *passive chamaephytes* (prostrate shoots that are perennial throughout; tip of stem erect); *active chamaephytes* (prostrate shoots that are perennial throughout; stem entirely prostrate); and *cushion chamaephytes* (low erect shoots growing in dense clusters).

Hemicryptophytes are characteristic of temperate regions where the dry season is not too prolonged. Before the unfavourable season sets in, the aerial shoots die down to the surface of the ground, life being carried on from year to year by the subterranean organs upon which the hibernating buds persist. Rosette and semi-rosette plants usually fall into this group.

Cryptophytes are not the dominant life form of any particular climate, although with their buds buried in the soil or submersed in water they are the best adapted of all life forms to resist desiccation and sudden marked changes in temperature.

Therophytes are characteristic of sub-tropical regions, their seeds resisting desiccation during the hot and dry season. They are rare or absent in arctic and alpine situations.

Jones has characterized the boreal life zones as follows in terms of life form:

(1) Arctic-alpine zone: entire absence of phanerophytes and therophytes; chamaephytes constitute more than 20 per cent; hemicryptophytes predominate.
(2) Hudsonian zone: northern or altitudinal limits of phanerophytes; therophytes almost completely absent; chamaephytes and hemicryptophytes decrease in percentage; cryptophytes increase in percentage.
(3) Canadian zone: a phanerophytic zone in which the percentage of chamaephytes and hemicryptophytes is considerably reduced, and that of cryptophytes increased; lowest zone to show a minor quantity of therophytes.

Significance is attached to the 'biochores' indicated by 10, 20, and 30 per cent chamaephytes in the plant spectrum. According to Raunkiaer (1934), the 10 per cent chamaephyte biochore lies between the Faeroes and Shetlands, in Norway it divides the lowlands from the highlands and extreme north, in Siberia it divides the Yenisei about 67 degrees north latitude, and in America it lies between Sitka and Chilcat (Alaska) and passes through southern Labrador. The 20 per cent biochore lies between Scandinavia and Spitsbergen and fringes the arctic coasts of Asia, crossing Bering Strait between St. Lawrence Island and the Commander Islands and following the arctic coasts of Canada. The 30 per cent biochore includes Baffin Land, Franz Josef Land, and Jan Mayen Island, but does not touch the arctic coasts of Asia or Alaska. The biochores agree approximately with recognized isotherms, the 20 per cent chamaephyte corresponding closely with the 4·4 degrees C. June isotherm and the 10 per cent one with the 10 degrees C. June isotherm.

In determining the life forms of the plants treated in the systematic part of this work, the writer has consulted the papers of Raunkiaer (1934), Taylor (1915), Ennis (1928), Böcher (1933), Gelting (1934), Gröntved (1942), Jones (1936, 1938), and McDonald (1937), as well as the textbook of Braun-Blanquet (1932). Plants not treated in these papers have been examined in the herbarium and studied in the descriptive literature. Pteridophytes are not included in the spectra, as Raunkiaer's normal (world) spectrum was based upon flowering plants only. Life form symbols have been assigned to species only, except where the species is represented in our area only by a variety. The various life form classes have been further subdivided as shown in Table X.

Table X. Life Form Classification of Native and Total Spermatophyte Flora

		Native	*Total*
	Phanerophytes		
MM	Mesophanerophytes; exceeding 8 m. in height	17	17
M	Microphanerophytes; 2–8 m. in height	31	31
N	Nanophanerophytes; less than 2 m. in height	62	67
		(110)	(115)
	Chamaephytes		
Ch	(semi-shrubby)	31	33
Ch	(passive)	32	34
Ch	(active)	8	9
Ch	(cushion)	13	13
		(84)	(89)
	Hemicryptophytes		
Hp	Protohemicryptophyte without runners	37	58
Hpr	Protohemicryptophyte with runners	68	81
Hs	Hemicryptophyte, semi-rosette, without runners	191	239
Hsr	Hemicryptophyte, semi-rosette, with runners	93	103
Hr	Hemicryptophyte, rosette, without runners	38	45
Hrr	Hemicryptophyte, rosette, with runners	33	38
		(460)	(564)
	Cryptophytes		
Grh	Rhizome geophyte	103	107
Gst	Stem-tuber geophyte	10	11
Grt	Root-tuber geophyte	10	12
Gr	Root geophyte	6	8
Gb	Bulb geophyte	8	8
Hel	Helophyte	24	24
HH	Hydrophyte	47	48
		(208)	(218)
	Therophytes		
T	Therophyte	71	163
	Total spermatophytes	933	1,149

The life form spectra of the spermatophytes of Gaspe and Bic are shown in Table XI, along with the spectra of other floristic regions for purposes of comparison, and Raunkiaer's normal world spectrum.

The order is as follows:

(a) Gaspe Peninsula and Bic (native species).
(b) Gaspe Peninsula and Bic (native and naturalized species).
(c) Alpine Shickshock flora of Gaspe (*See* systematic part of this work).
(d) Calcicole flora of Gaspe (*See* systematic section; 125 species used in compiling table IX).
(e) West and central Quebec (based on ranges in Marie-Victorin's "Flore Laurentienne").
(f) Quebec (range of "Flore Laurentienne").
(g) Cape Breton Island (from McDonald, 1937).
(h) Connecticut (Ennis, 1928).
(i) Indiana (McDonald, 1937).
(j) Olympic Peninsula, Wash. (Jones, 1936).
(k) Southern James Bay (based on Potter's list, 1932).
(l) Northern Labrador (based on Abbe's list, 1936).
(m) Canadian Eastern Arctic (based on Polunin's flora, 1940).

Table XI. Life Form Spectra of Plants of Various Climatic Districts

Species		Ph	Ch	H	Cr	T
(a)	933	12·1	9·0	49·0	22·1	7·5
(b)	1,149	10·3	7·8	48·7	18·9	14·1
(c)	207	12·7	24·8	48·7	11·6	2·1
(d)	125	6·6	27·2	51·2	9·1	5·8
(e)	1,283	16·6	3·5	43·6	22·4	13·8
(f)	1,504	15·1	4·8	45·0	21·8	13·3
(g)	637	14·1	1·8	51·3	25·6	6·7
(h)	1,453	15·0	1·9	49·4	21·7	11·7
(i)	1,837	15·3	1·7	50·3	19·6	13·0
(j)	1,015	11·0	6·0	52·0	22·0	9·0
(k)	302	17·5	10·3	49·5	21·2	1·3
(l)	185	5·4	29·7	50·3	12·4	2·1
(m)	286	3·5	29·4	54·5	10·5	2·1
Normal spectrum		46·0	9·0	26·0	6·0	13·0

Examination of the above table shows that all of the climates may be described as hemicryptophytic as opposed to the mild phanerophytic "world climate" indicated by the normal spectrum. Regions (c), (d), (l), and (m), however, are especially rich in chamaephytes and poor in therophytes, indicating adaptation to the decreasing warmth and often increasing aridity of alpine (c), sea cliff and river gravel (d), and arctic (l, m) habitats. The increase of chamaephytes to 9 per cent in Gaspe (a) over 4·8 per cent for southwestern Quebec (f) reflects the influence of the rather specialized climatic features of the peninsula discussed in a previous section.

AFFINITIES OF THE GASPE FLORA

The following geographical subdivisions have been assigned to the plants treated in the systematic part of this work:

Temperate circumpolar: extending north to the southern boundary of the Northern Conifer Forest or of the Hudsonian Biotic Province (Gaspe to north shore of Lake Superior, southern Manitoba and Saskatchewan, central Alberta and British Columbia); temperate Eurasia.

Temperate American: American part of the above range.

Temperate Eastern American: American part of range east of approximately longitude 100 degrees W. (Gaspe to Manitoba).

(Boreal-)temperate circumpolar, (Boreal-)temperate American, (Boreal-) temperate Eastern American: similar to the above subdivisions, but including Newfoundland.

Boreal circumpolar: extending north to the northern limit of the Northern Conifer Forest or Hudsonian Biotic Province (Newfoundland to middle Hudson Bay, Great Bear Lake, upper Mackenzie Delta, southern Alaska); Eurasia.

Boreal American: American part of the above range.

Boreal Eastern American: American part of range east of approximately longitude 100 degrees W. (southern Labrador and Newfoundland to James Bay and Manitoba).

(Arctic-)boreal circumpolar, (Arctic-)boreal American, (Arctic-)boreal Eastern American: similar to the Boreal subdivisions, but including northern Labrador.

Arctic circumpolar: extending north of the tree line, including coastal Labrador north of Hamilton Inlet, Ungava Bay, northernmost Quebec, Hudson Bay north of Cape Henrietta Maria and Churchill, Northwest Territories north of Chesterfield Inlet and Great Bear Lake, the islands of the Canadian Arctic Archipelago, and the north coasts of Yukon and Alaska to Seward Peninsula; arctic Eurasia.

Arctic American: American part of the above range.

Arctic Eastern American: American part of range east of approximately longitude 100 degrees W.

The other terms employed in Table XII, which summarizes the geographical affinities of the flora (the variety is included only when the main form is absent) are self-explanatory.

With respect to southern extensions, the more widespread native plants (first 15 subdivisions of Table XII) may be classified (Table XIII) as follows:

(a) South to approximately latitude 48 degrees N. (B.C., Alb., Sask., Man., Ont., Gaspe).

(b) South to approximately latitude 40 degrees N. (n. Calif., Oreg., Idaho, Wyo., S. Dak., Nebr., Iowa, Ill., Ind., Ohio, Pa., N. Eng., N.Y.).

(c) South to approximately latitude 35 degrees N. (Calif., Nev., Utah, Colo., Kans., Mo., Ky., Tenn., Va., N.C.).

(d) South to approximately latitude 30 degrees N. (Calif., Ariz., N. Mex., Tex., Okla., La., Ark., Miss., Ala., Ga., S.C., Fla.).

(e) South to Mexico.

Table XII. Geographical Affinities of the Gaspe Flora

Subdivision	Species	Per cent of total species (1216)	Per cent of native species (1000)
Arctic circumpolar	100	8·22	10·00
Arctic American	27	2·22	2·70
Arctic eastern American	6	0·49	0·60
(Arctic-) boreal circ.	37	3·04	3·70
(Arctic-) boreal Am.	25	2·05	2·50
(Arctic-) boreal e. Am.	8	0·66	0·80
Boreal circumpolar	104	8·54	10·40
Boreal American	190	15·62	19·00
Boreal eastern American	38	3·12	3·80
(Boreal-) temperate circ.	26	2·13	2·60
(Boreal-) temperate Am.	81	6·66	8·10
(Boreal-) temperate e. Am.	82	6·74	8·20
Temperate circumpolar	7	0·57	0·70
Temperate American	68	5·59	6·80
Temperate eastern American	87	7·15	8·70
Amphi-Atlantic	9	0·74	0·90
Disjunct American	62	5·09	6·20
Gulf endemic	17	1·39	1·70
Quebec endemic	4	0·32	0·40
Gaspe endemic	6	0·49	0·60
Local endemic	16	1·31	1·60
Western American	8	0·66	
South American	4	0·32	
South African	1	0·08	
Asiatic	8	0·66	
European	124	10·19	
Eurasian	71	5·83	

Table XIII. Southern Extensions of Widespread Species Classified in Table XII as Arctic Circumpolar (1) to Temperate Eastern American (15)

	(a)		(b)		(c)		(d)		(e)	
	Alp.[1]	Low.	Alp.	Low.	Alp.	Low.	Alp.	Low.	Alp.	Low.
1	12	5	41	15	14	7	12	7		7
2	6	3	7	6	7	3				
3	7	1	1							
4	3		7	9	8	10	2	10		1
5	2		4	13	2	4	2	1		1
6	3		5	1	1					
7		7	6	37	5	25		35		5
8	2	3	6	64	4	55		80		4
9		13	3	20	2	7		7		
10		1		8		8		12		1
11		22		21		52				1
12	1	4	3	57		23		28		
13				2		3		6		1
14				11		19	2	36		5
15		5	1	36		23		38		1

[1] Alp., alpine; Low., lowland.

The alpine plants of Table XIII have been further classified in Table XIV according to their northward extension.

Table XIV. Northward Extension of More Widespread Alpine Plants of Gaspe and Bic

Northern extension	Number	
Arctic		107
circumpolar	79	
American	20	
eastern American	8	
(Arctic-) boreal		39
circumpolar	20	
American	10	
eastern American	9	
Boreal		28
circumpolar	11	
American	12	
eastern American	5	
(Boreal-) temperate		4
circumpolar	0	
American	0	
eastern American	4	
Temperate		3
circumpolar	0	
American	0	
eastern American	3	
Total	181	181

The following species indigenous to Quebec, treated in Marie-Victorin's "Flore Laurentienne", apparently do not include the Gaspe Peninsula or Bic in their range. (Changes in nomenclature may be found in Dr. Ernest Rouleau's "Supplément à la Flore Laurentienne", 1947.)

Polystichum acrostichoides
Dryopteris noveboracensis
D. Goldiana
Woodwardia virginica
Camptosorus rhizophyllus
Athyrium pycnocarpum
Ophioglossum vulgatum
Botrychium obliquum
B. dissectum
B. multifidum
B. silaifolium
Equisetum litorale
Lycopodium inundatum
Selaginella apoda
Isoetes riparia
I. Tuckermani
Juniperus virginiana
Tsuga canadensis
Typha angustifolia
Sparganium hyperboreum
S. androcladum
Potamogeton Spirillus
P. Robbinsii
P. Oakesianus
P. crispus
P. americanus
P. angustifolius
P. Vaseyi
P. Friesii
P. strictifolius
P. gemmiparus
Naias guadalupensis
Alisma subcordatum
A. gramineum
Sagittaria heterophylla
S. graminea
Anacharis canadensis
Vallisneria americana
Glyceria septentrionalis
Poa debilis
P. alsodes
Festuca nutans
F. octoflora
Bromus purgans
Eragrostis hypnoides
E. pectinacea
Danthonia compressa
Sphenopholis obtusata
Hystrix patula
Cinna arundinacea
Sporobolus vaginiflorus
S. neglectus

S. uniflorus
S. cryptandrus
S. heterolepis
Oryzopsis racemosa
Leersia virginica
Zizania aquatica
Z. palustris
Panicum virgatum
P. clandestinum
P. xanthophysum
P. Boscii
P. latifolium
P. Tuckermani
P. Gattingeri
P. philadelphicum
P. flexile
P. barbipulvinatum
P. depauperatum
P. linearifolium
P. boreale
P. lanuginosum
P. tsugetorum
P. subvillosum
Echinochloa muricata
Sorghastrum nutans
Schizachyrium scoparium
Andropogon furcatus
Cyperus diandrus
C. aristatus
C. filiculmis
C. Houghtonii
C. dentatus
C. esculentus
C. strigosus
Eleocharis compressa
E. Macounii
Rynchospora glomerata
Stenophyllus capillaris
Scirpus Smithii
S. Torreyi
S. heterochaetus
S. campestris
S. fluviatilis
S. sylvaticus
Eriophorum tenellum
Fimbristylis autumnalis
Mariscus mariscoides
Carex intermedia
C. convoluta
C. radiata
C. Muhlenbergii
C. cephalophora
C. cephaloidea
C. sparganioides
C. alopecoidea
C. setacea
C. atlantica
C. sychnocephala
C. foenea
C. cristatella
C. cumulata
C. normalis
C. brevior
C. Merritt-Fernaldii
C. Bicknellii
C. Wildenowii
C. rugosperma
C. hirtifolia
C. plantaginea
C. careyana
C. platyphylla
C. heterosperma
C. albursina
C. blanda
C. Shriveri
C. gracilescens
C. Hitchcockiana
C. katahdinensis
C. conoidea
C. grisea
C. formosa
C. Davisii
C. Sprengelii
C. substricta
C. trichocarpa
C. laxior
C. folliculata
C. lurida
C. Tuckermani
C. squarrosa
C. typhina
C. Asa-Grayi
C. lupulina
Arisaema Stewardsonii
A. Dracontium
Peltandra virginica
Lemna trisulca
Spirodela polyrhiza
Eriocaulon Parkeri
Pontederia cordata
Heteranthera dubia
Juncus compressus
J. Vaseyi
J. pelocarpus
J. canadensis
Smilax herbacea
Trillium grandiflorum
Medeola virginiana
Uvularia perfoliata
U. grandiflora
Lilium philadelphicum
Allium tricoccum
A. canadense
Cypripedium arietinum
Orchis spectabilis
Habenaria macrophylla
H. blephariglottis
H. leucophaea
H. fimbriata
H. lacera
H. flava
Epipactis latifolia
Pogonia ophioglossoides
Aplectrum hyemale
Goodyera pubescens
Spiranthes gracilis

S. lucida
Saururus cernuus
Salix amygdaloides
S. nigra
S. serissima
S. petiolaris
Comptonia asplenifolia
Juglans cinerea
Carya cordiformis
C. ovata
Betula lenta
B. populifolia
Ostrya virginiana
Carpinus caroliniana
Quercus bicolor
Q. alba
Q. macrocarpa
Ulmus racemosa
U. fulva
Celtis occidentalis
Pilea pumila
Boehmeria cylindrica
Polygonella articulata
P. scandens
P. dumetorum
P. arifolium
P. Douglasii
P. ramosissimum
P. erectum
P. virginianum
P. coccineum
P. pensylvanicum
P. punctatum
P. hydropiperoides
Rumex verticillatus
Cycloloma atriplicifolium
Acnida tuberculata
Phytolacca americana
Mollugo verticillata
Silene antirrhina
Arenaria stricta
Ceratophyllum demersum
Nymphaea tuberosa
Ranunculus longirostris
Hepatica acutiloba
Anemone cylindrica
A. virginiana
Thalictrum dioicum
Menispermum canadense
Podophyllum peltatum
Dicentra canadensis
Adlumia fungosa
Armoracia aquatica
Draba nemorosa
Dentaria laciniata
D. maxima
Arabis glabra
A. laevigata
Cardamine parviflora
C. bulbosa
Rorippa amphibia
R. obtusa
Polanisia graveolens
Podostemon ceratophyllum
Tillaea aquatica
Penthorum sedoides
Ribes americanum
R. Cynosbati
Tiarella cordifolia
Mitella diphylla
Hamamelis virginiana
Amelanchier sanguinea
A. humilis
A. stolonifera
A. canadensis
Crataegus Oxyacantha
C. Crus-galli
C. punctata
C. suborbiculata
C. acutiloba
C. blandita
C. crudelis
C. flabellata
C. matura
C. pentandra
C. congestiflora
C. cognata
C. densiflora
C. fluviatilis
C. Holmesiana
C. lenta
C. anomala
C. canadensis
C. champlainensis
C. submollis
C. dilatata
C. Blanchardii
C. Dodgei
C. Jackii
C. Jonesae
C. lemingtonensis
C. praecoqua
C. rotundifolia
C. affinis
C. asperifolia
C. Kieskerniana
C. scabrida
C. aquilonaris
C conspicua
C. dumicola
C. ferentaria
C. fertilis
C. integriloba
C. macracantha
C. rhombifolia
C. succulenta
C. Victorinii
Prunus nigra
P. serotina
Physocarpus opulifolius
Spiraea tomentosa
S. alba
Rosa palustris
Rubus odoratus
R. occidentalis
R. biformispinus

R. flagellaris
R. oriens
R. hispidus
R. trifrons
R. jacens
R. tardatus
R. setosus
R. vermontanus
R. canadensis
R. Randii
R. allegheniensis
R. glandicaulis
R. pergratus
R. heterophyllus
Potentilla simplex
P. pensylvanica
Dalibarda repens
Waldsteinia fragarioides
Vicia americana
Lathyrus ochroleucus
Desmodium nudiflorum
D. grandiflorum
D. Dillenii
Apios americana
Amphicarpaea bracteata
Strophostyles helvola
Astragalus canadensis
A. labradoricus
Geranium carolinianum
Zanthoxylum americanum
Ptelea trifoliata
Polygala polygama
P. sanguinea
P. Senega
Acalypha virginica
Euphorbia maculata
Callitriche stagnalis
C. hermaphroditica
Empetrum atropurpureum
Rhus Vernix
R. canadensis
Celastrus scandens
Staphylea trifolia
Acer nigrum
Ceanothus americanus
C. ovatus
Vitis vulpina
Tilia glabra
Hypericum Kalmianum
H. Ascyron
H. canadense
H. mutilum
H. majus
Elatine americana
Lechea intermedia
Viola sororia
V. lanceolata
V. primulifolia
V. rotundifolia
V. rostrata
V. eriocarpa
V. canadensis
Dirca palustris
Decodon verticillatus
Circaea latifolia
Isnardia palustris
Epilobium coloratum
E. ecomosum
Oenothera angustissima
Proserpinaca palustris
Myriophyllum tenellum
Panax quinquefolium
P. trifolium
Hydrocotyle americana
Sanicula gregaria
Taenidia integerrima
Zizia aurea
Cornus Amomum
Pyrola uliginosa
Gaylussacia baccata
Vaccinium corymbosum
Lysimachia lanceolata
L. quadrifolia
Fraxinus pensylvanica
Nymphoides lacunosum
Bartonia virginica
Gentiana crinita
G. Victorinii
G. Andrewsii
Asclepias incarnata
Cuscuta Gronovii
C. pentagona
Convolvulus spithamaeus
Phlox maculata
P. divaricata
Hydrophyllum virginianum
Hackelia virginiana
Mertensia paniculata
Lithospermum latifolium
Verbena hastata
V. angustifolia
V. urticaefolia
Teucrium canadense
T. occidentale
Isanthus brachiatus
Scutellaria parvula
Agastache nepetoides
Physostegia virginiana
Stachys aspera
Monarda fistulosa
Hedeoma fistulosa
Pycnanthemum virginianum
Physalis heterophylla
Solanum nigrum
Pedicularis canadensis
P. Furbishiae
Linaria canadensis
Veronica peregrina
Ilysanthes dubia
Gratiola lutea
G. aurea
Gerardia purpurea
Penstemon hirsutus
P. laevigatus
Utricularia gibba
U. purpurea

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V. affine
V. Lentago
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L. dioica
Sicyos angulatus
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Hieracium paniculatum
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B. connata
B. Eatoni
B. discoidea
B. vulgata
B. Beckii
Gnaphalium decurrens
G. obtusifolium
Erechtites hieracifolia
Cirsium discolor
Eupatorium perfoliatum
Heliopsis scabra
Helenium autumnale
Helianthus divaricatus
H. decapetalus
H. strumosus
Rudbeckia laciniata
Solidago caesia
S. bicolor
S. puberula
S. Randii
S. juncea
S. serotina
S. nemoralis
Erigeron annuus
Aster linariifolius
A. angustus
A. Lowrieanus
A. novae-angliae
A. paniculatus
A. lucidulus
A. longifolius
A. ontarionis
A. Tradescanti
A. nemoralis
A. johannensis
A. ptarmicoides

TABULAR CLASSIFICATION

Families	Genera	Species		Varieties		Forms	
		Nat.	Int.	Nat.	Int.	Nat.	Int.
PTERIDOPHYTA							
Polypodiaceae	15	35	—	7	—	3	—
Osmundaceae	1	3	—	—	—	1	—
Ophioglossaceae	1	6	—	4	—	1	—
Equisetaceae	1	8	—	2	—	8	—
Lycopodiaceae	1	11	—	14	—	4	—
Selaginellaceae	1	2	—	—	—	—	—
Isoetaceae	1	2	—	—	—	—	—
	(21)	(67)	—	(27)	—	(17)	—
GYMNOSPHERMAE							
Taxaceae	1	1	—	—	—	—	—
Pinaceae	6	10	—	2	—	6	—
	(7)	(11)	—	(2)	—	(6)	—
MONOCOTYLEDONEAE							
Typhaceae	1	1	—	—	—	—	—
Sparganiaceae	1	7	—	1	—	—	—
Naiadaceae	5	19	—	8	—	—	—
Juncaginaceae	2	3	—	—	—	—	—
Alismaceae	2	3	—	—	—	3	—
Gramineae	39	77	22	23	1	8	7
Cyperaceae	7	143	—	22	—	3	—

TABULAR CLASSIFICATION—*Con.*

Families	Genera	Species		Varieties		Forms	
		Nat.	Int.	Nat.	Int.	Nat.	Int.
MONOCOTYLEDONEAE—*conc.*							
Araceae	4	4	—	—	—	—	—
Lemnaceae	1	1	—	—	—	—	—
Eriocaulaceae	1	1	—	—	—	—	—
Juncaceae	2	22	—	5	—	3	—
Liliaceae	13	19	1	3	—	4	—
Iridaceae	2	3	—	1	—	1	—
Orchidaceae	12	29	—	—	—	—	—
	(92)	(332)	(23)	(63)	(1)	(22)	(7)
DICOTYLEDONEAE							
Salicaceae	2	30	—	17	—	3	—
Myricaceae	1	1	—	1	—	—	—
Betulaceae	3	10	—	8	—	2	—
Fagaceae	2	2	—	1	—	—	—
Urticaceae	4	6	2	—	—	—	—
Ulmaceae	1	1	—	—	—	—	—
Santalaceae	2	2	—	—	—	—	—
Loranthaceae	1	1	—	—	—	—	—
Aristolochiaceae	1	1	—	—	—	—	—
Polygonaceae	5	13	13	1	2	3	—
Chenopodiaceae	6	8	5	3	1	—	—
Amaranthaceae	1	1	1	—	—	—	—
Caryophyllaceae	12	24	13	5	—	2	—
Portulacaceae	2	2	—	—	—	—	—
Nymphaeaceae	3	6	—	—	—	—	—
Ranunculaceae	10	31	4	4	2	7	—
Berberidaceae	1	1	—	—	—	—	—
Papaveraceae	2	1	1	—	—	—	—
Fumariaceae	3	3	1	—	—	—	—
Cruciferae	26	29	27	7	2	—	—
Sarraceniaceae	1	1	—	—	—	—	—
Droseraceae	1	4	—	1	—	—	—
Crassulaceae	1	—	2	—	—	—	—
Saxifragaceae	5	18	2	2	—	2	—
Rosaceae	16	54	4	10	—	4	—
Leguminosae	10	12	19	5	2	2	—
Linaceae	1	—	1	—	—	—	—
Oxalidaceae	1	3	—	—	—	—	—
Geraniaceae	2	2	2	—	—	—	—
Polygalaceae	1	1	—	—	—	—	—
Euphorbiaceae	1	1	1	—	—	—	—
Callitrichaceae	1	3	—	—	—	—	—
Empetraceae	1	1	—	—	—	1	—
Anacardiaceae	1	2	—	—	—	—	—
Aquifoliaceae	2	2	—	—	—	—	—
Aceraceae	1	4	—	—	—	—	—
Balsaminaceae	1	2	—	—	—	—	—
Rhamnaceae	1	1	—	—	—	—	—
Malvaceae	1	—	2	—	—	—	—
Hypericaceae	1	4	1	—	—	—	—
Cistaceae	1	1	—	—	—	—	—
Violaceae	1	15	1	2	—	—	—
Elaeagnaceae	2	2	—	—	—	—	—
Lythraceae	1	—	1	—	—	—	—
Onagraceae	3	17	—	6	—	4	—
Haloragidaceae	2	5	—	1	—	1	—
Araliaceae	1	3	—	—	—	—	—
Umbelliferae	13	14	5	1	—	—	1
Cornaceae	1	5	—	—	—	2	—
Ericaceae	20	37	—	5	—	4	—
Diapensiaceae	1	1	—	—	—	—	—

TABULAR CLASSIFICATION—*Con.*

Families	Genera	Species		Varieties		Forms	
		Nat.	Int.	Nat.	Int.	Nat.	Int.
DICOTYLEDONEAE—*con.*							
Plumbaginaceae	2	2	—	—	—	—	—
Primulaceae	5	9	—	1	—	1	—
Oleaceae	1	2	—	—	—	—	—
Gentianaceae	4	7	—	—	—	—	—
Apocynaceae	1	4	—	—	—	1	—
Asclepiadaceae	1	1	—	—	—	—	—
Convolvulaceae	1	1	1	—	—	—	—
Polemoniaceae	2	1	1	—	—	—	—
Boraginaceae	8	4	7	—	—	—	—
Labiatae	13	9	8	1	1	5	—
Solanaceae	4	1	3	—	—	—	—
Scrophulariaceae	14	24	9	3	—	—	—
Lentibulariaceae	2	5	—	—	—	—	—
Orobanchaceae	1	1	—	—	—	—	—
Plantaginaceae	2	5	2	2	—	2	—
Rubiaceae	2	11	1	1	—	—	—
Caprifoliaceae	6	11	1	2	—	1	—
Valerianaceae	1	2	—	—	—	—	—
Dipsacaceae	1	—	1	—	—	—	—
Cucurbitaceae	1	1	—	—	—	—	—
Campanulaceae	1	2	2	2	—	—	—
Lobeliaceae	1	4	—	—	—	—	—
Compositae	40	95	49	35	3	15	3
	(298)	(590)	(193)	(127)	(13)	(62)	(4)
Totals	418	1,000	216	219	14	107	11

Families	97
Genera	418
Species	1,216
Varieties	233
Forms	118

The 1,216 species include 130 plants that are represented only by one or more varieties or subspecies. The typical form is apparently absent, being in many cases the Old World or Western American vicariad.

ABBREVIATIONS

In denoting the more common localities in Gaspe to which herbarium specimens or those cited in the literature have been referred, the following abbreviations have been used (passing along the north coast from west to east, and returning by Chaleur Bay and the Matapedia Valley):

Rim.	Rimouski
Fla.	Ste. Flavie
Mét.	Métis
Mtn.	Matane
Gro.	Grosses Roches
Cap.	Capucins
Ann.	Ste. Anne des Monts R.
Trl.	Tourelle
Srl.	Ruisseau Sorel

Mrn.	Gros Morne
Cld.	Rivière à Claude
Prr.	Mont St. Pierre
Lou.	Mont Louis
Plr.	Cap Pleureuse
Mad.	Rivière Madeleine
Val.	Grande Vallée
Clr.	Cloridorme
Tng.	Grand Etang
Ren.	Rivière aux Renards (Fox River)
Ros.	Cap des Rosiers
Lbn.	Mont St. Alban
For.	Forillon Peninsula
Pén.	La Péninsule
Drt.	Dartmouth R.
Gpe.	Gaspe village
Yrk.	York R.
Jhn.	St. John R.
Dou.	Douglastown
Bnc.	Coin du Banc (Corner of the Beach)
Pcé.	Percé
Gnd.	Grand Rivière
Pab.	Rivière Petit Pabos
Cha.	Chandler
Dan.	Port Daniel
God.	St. Godefroi
Pas.	Paspébiac
Bon.	Bonaventure R.
Oie.	Lac à l'Oie, New Richmond
PCa.	Rivière Petite Cascapédia
GCa.	Rivière Grande Cascapédia
Mar.	Maria
Car.	Carleton
Tra.	Tracadigash Mt. (Mt. St. Joseph)
Nou.	Rivière Nouvelle
Esc.	Escuminac
Mat.	Matapedia R.
Res.	Restigouche R.
Irn.	Ste. Irène
Zén.	St. Zénon

Localities in the Shickshock Mountains are abbreviated as follows:

Alb.	Mt. Albert
Tbl.	Tabletop Mt.
Log.	Mt. Logan
Mtt.	Mt. Mattaouisse (Mattawa)
Pem.	Mt. Pembroke
Str.	Mt. Sterling
Col.	Mt. Collins
Lyl.	Mt. Lyall
Ftn.	Mt. Fortin
Nic.	Mt. Nicolabert
Bln.	Mt. Blanc

The abbreviations of the states and provinces of North America are those in common use and are not given here.

The explanation of the Life Form symbols has been given in Table X.

SYSTEMATIC SECTION

Artificial Key to the Families of Vascular Plants

- a. Reproduction by spores in sporangia on the under side of the leaves, in the leaf axils, in cone-like spikes, or on short basal branches. *(Pteridophyta.)*
  - b. Leaves (fronds) broad, flat, and fern-like, more or less pinnately or ternately divided or entire.
    - c. Sporangia with an annulus, splitting open by a transverse cleft on one side, the walls 1 cell thick; fronds similar or dimorphic ....1. *Polypodiaceae*
    - c. Sporangia without an annulus, splitting open by a vertical slit; fronds dimorphic or at least the fertile and sterile divisions very dissimilar.
      - d. Sporangia on special modified fronds or on much modified divisions at the summit or middle of the sterile frond; walls of the sporangia 1 cell thick; rootstocks stout; fronds in large clumps....................2. *Osmundaceae*
      - d. Sporangia aggregated in spikes or panicles apparently at the summit of the stem, with the leaf-like sterile part lateral or basal; walls of the sporangia several cells thick; rootstocks practically wanting; fronds not in clumps ....3. *Ophioglossaceae*
  - b. Leaves subulate, scale-like.
    - c. Leaves whorled, forming sheaths at the nodes of the jointed, mostly hollow stems; sporangia in terminal spikes ....4. *Equisetaceae*
    - c. Leaves not whorled; stems not conspicuously jointed.
      - d. Plants small and moss-like; spores of two kinds, small and large, in different sporangia ....6. *Selaginellaceae*
      - d. Plants not moss-like, the stems often long and creeping; spores all alike, small ....5. *Lycopodiaceae*
  - b. Leaves long and quill-like, all basal; aquatic plants ....7. *Isoetaceae*
- a. Reproduction by seeds each containing an embryo; plants with true flowers. *(Spermatophyta.)*
  - b. Ovules and seeds exposed on open bracts; trees and shrubs with needle-shaped, awl-shaped, or scale-like, mostly evergreen leaves. *(Gymnospermae.)*
    - c. Fruit a cone, or bluish and berry-like.............................9. *Pinaceae*
    - c. Fruit red and berry-like ....8. *Taxaceae*
  - b. Ovules and seeds in a closed ovary. *(Angiospermae.)*
    - c. Parts of the flowers usually in threes or sixes, never in fives; leaves parallel-veined; plants herbaceous ....Class 1. *MONOCOTYLEDONEAE*
    - c. Parts of the flowers mostly in fours or fives; leaves net-veined; herbs, shrubs, or trees ....Class 2. *DICOTYLEDONEAE*

Class 1. *MONOCOTYLEDONEAE*

- a. Small, free-floating plants, without true leaves, the single frond of each plant bearing flowers and simple roots or none ....18. *Lemnaceae*
- a. Plants rooted in the ground and possessing stems and true leaves.
  - b. Perianth absent or consisting of scales, bristles, or chaffy bracts.
    - c. Flowers enclosed by chaff-like bracts or glumes; stems jointed; leaves narrow and sheathing.
      - d. Stems terete or compressed, usually hollow; leaf sheaths split ....15. *Gramineae*
      - d. Stems mostly somewhat triangular, usually solid; sheaths closed..16. *Cyperaceae*

c. Flowers not enclosed in scale-like or chaff-like bracts.
d. Immersed aquatics, branching and leafy, the upper leaves often floating.
e. Flowers perfect ....12. *Naiadaceae*
e. Flowers monoecious or dioecious.
f. Flowers in globose heads .... 11. *Sparganiaceae*
f. Flowers axillary, solitary ....12. *Naiadaceae*
d. Terrestrial or marsh plants.
e. Leaves petioled, the blade net-veined ....17. *Araceae*
e. Leaves not petioled; linear or sword-shaped, parallel-veined.
f. Flowers monoecious or dioecious.
g. Flowers in cylindrical spikes...........................10. *Typhaceae*
g. Flowers in heads.
h. Heads spheroidal, pubescent, involucrate ....19. *Eriocaulaceae*
h. Heads globose, glabrous, not involucrate ....11. *Sparganiaceae*
f. Flowers perfect.
g Ovaries 3-6, separating at least when ripe ....13. *Juncaginaceae*
g. Ovary single, 3-carpeled ....20. *Juncaceae*

b. Perianth present, herbaceous or coloured, neither scale-like nor bristle-form.
c. Perianth free from the ovary (ovary superior).
d. Marsh plants with sheathing, strongly veined leaves; the 3 petals white; the numerous carpels separate in a head or ring ....14. *Alismaceae*
d. Marsh plants with rush-like or grass-like leaves; the 3 petals greenish or greenish yellow; the 3-6 carpels more or less united ....13. *Juncaginaceae*
d. Mostly terrestrial plants; perianth of 6 in *Maianthemum* 4) similar divisions, coloured alike except in *Trillium;* one stamen in front of each part of the perianth ....21. *Liliaceae*
d. Grass-like or sedge-like plants, with greenish or purplish brown flowers; the six divisions of the perianth small and glume-like ....20. *Juncaceae*
c. Perianth united to the ovary (ovary inferior).
d. Flowers irregular; stamens 1-2, gynandrous; seeds innumerable ..23. *Orchidaceae*
d. Flowers regular, blue; leaves 2-ranked, folded lengthwise, each astride of the next one within; stamens 3, opposite the outer segments of the perianth ....22. *Iridaceae*

Class 2. *DICOTYLEDONEAE*

a. Corolla none (apetalous); calyx present or absent.
b. Flowers monoecious or dioecious, one or both sorts in catkins.
c. Only one sort of flowers in catkins or catkin-like heads.
d. Herbs with mostly opposite, palmately lobed or divided leaves; fruit a glandular achene ....28. *Urticaceae*
d. Trees with alternate simple leaves; fruit a 1-seeded nut contained in a cup or involucre ....27. *Fagaceae*
c. Both staminate and pistillate flowers in catkins or catkin-like heads.
d. Fruit 1-celled, many-seeded, the seeds tufted with silky down; trees or shrubs with alternate simple leaves ....24. *Salicaceae*
d. Fruit a 1-celled, 1-seeded nut; fertile flowers 2 or 3 under each bract; trees or shrubs with alternate simple leaves ....26. *Betulaceae*
d. Nutlets naked, drupe-like; fertile flowers 1 under each bract; shrubs with resinous-dotted, fragrant leaves ....25. *Myricaceae*

b. Flowers not in catkins.
c. Calyx absent as well as the corolla; ovary 4-celled; styles 2; aquatic herbs with opposite entire leaves ....55. *Callitrichaceae*
c. Calyx present.
d. Calyx free from the ovary (ovary superior).
e. Ovaries more than 1.

f. Ovaries separate.

Herbs with compound or lobed leaves; calyx 4-parted; stamens on the calyx; carpels 1-4 ....48. *Rosaceae*

Herbs or woody climbers; sepals usually coloured or petal-like; stamens on the receptacle ....39. *Ranunculaceae*

f. Ovaries united into a compound pistil with more than 1 cell.

Herbs with milky juice; no true calyx but a calyx-like involucre surrounding flowers; ovary 3-celled, 3-seeded ....54. *Euphorbiaceae*

Herbs with opposite entire leaves and stems that are usually swollen at the joints; styles 2-5; ovary usually 1-celled ....36. *Caryophyllaceae*

Herbs having flowers with 2 stamens and a 2-celled silicle flattened contrary to the partition (*Lepidium*) ....43. *Cruciferae*

Low fleshy herb growing on the seashore; ovary 1-celled, 5-valved, few-seeded (*Glaux*) ....76. *Primulaceae*

Trees with opposite leaves; flowers in clusters; ovary 2-celled; fruit two 1-seeded joined samaras ....59. *Aceraceae*

Trees with simple alternate leaves; styles 2; ovary 1-2-celled; fruit a 1-seeded samara winged all around ....29. *Ulmaceae*

Shrubs with simple leaves and greenish flowers; ovary 3-celled, 3-seeded, forming a black berry-like drupe ....61. *Rhamnaceae*

Shrubby evergreens with heath-like aspect and flowers solitary in the leaf axils; fruit a small drupe ....56. *Empetraceae*

e. Ovary only 1, 1-celled, 1-seeded.

Herbs having stems with swollen joints and stipules sheathing the stems.... ....33. *Polygonaceae*

Herbs with watery juice and simple leaves; flowers in spikes or racemes; style 1; fruit an achene ....28. *Urticaceae*

Herbs with exstipulate leaves and greenish flowers without bracts........... ....34. *Chenopodiaceae*

Weedy herbs with exstipulate leaves and greenish flowers, these spiked and interspersed with scarious bracts ....35. *Amaranthaceae*

Trees with opposite pinnate leaves; calyx small, 4-cleft, regular or reduced to a mere disk; fruit a 1-2-seeded samara ....77. *Oleaceae*

d. Calyx free from the ovary (ovary inferior).

Dwarf plants $\frac{1}{2}$-$\frac{3}{4}$ in. high, parasitic on the twigs of conifers ...31. *Loranthaceae*

Aquatic herbs; leaves entire or when immersed usually much dissected; stamens 1-8; capsule 1-4-celled, each cell 1-seeded ....69. *Haloragidaceae*

Small smooth herbs with decumbent forking stems and inconspicuous greenish yellow flowers; stamens 8-10, very short, inserted on a fleshy disk; capsule 1-celled (*Chrysosplenium*) ....47. *Saxifragaceae*

Low herbs with a single pair of kidney-shaped leaves; calyx 3-lobed, brownish purple inside; capsule 6-celled..........................32. *Aristolochiaceae*

Low herbs with greenish white flowers in umbel-like clusters; ovary 1-celled, forming a 1-seeded nutlet....................................30. *Santalaceae*

Shrubs with silvery-scurfy leaves; calyx 4-parted; fruit fleshy or berry-like ....66. *Elaeagnaceae*

a. Both calyx and corolla present.

b. Corolla of separate petals.

c. Stamens more than 10 and more than twice as many as the petals.

d. Calyx entirely free from the ovary (ovary superior).

e. Carpels several or many, wholly distinct or slightly united at the base.

Aquatic herbs with peltate leaves (*Brasenia*) ....38. *Nymphaeaceae*

Herbs with usually lobed or much dissected leaves; stamens hypogynous ....39. *Ranunculaceae*

Herbs with alternate stipulate leaves; flowers with numerous monadelphous stamens forming a column united at base to the petals.......62. *Malvaceae*

Plants with alternate, usually stipulate leaves; stamens perigynous........ ....48. *Rosaceae*

e. Carpels 1, or if more, united into a compound pistil, as shown in the number of its cells, placentae, styles or stigmas.

f. Pistil of a single carpel (simple).

Herbs with 2-3-ternately compound leaves; fruit a red or white berry (*Actaea*) ....39. *Ranunculaceae*

Trees or shrubs with simple, mostly serrate leaves; fruit a fleshy edible drupe with bony stone (*Prunus*) ....48. *Rosaceae*

f. Pistil of several carpels united (compound).

Herbs with entire dotted leaves; stamens in 3 or more clusters ....63. *Hypericaceae*

Herbs with milky or reddish juice; sepals 2, falling off very early ....41. *Papaveraceae*

Bog plants with pitcher-shaped leaves ....44. *Sarraceniaceae*

Aquatic herbs with cordate leaves and yellow or white flowers; petals numerous and stamen-like ....38. *Nymphaeaceae*

Low heath-like shrub with short, oval, close-pressed or imbricated leaves; flowers small, sessile, yellow, very numerous; sepals 5, unequal (*Hudsonia*) ....64. *Cistaceae*

d. Calyx united to the ovary (ovary inferior); shrubs or small trees with alternate stipulate leaves; stamens perigynous; fruit a pome ....48. *Rosaceae*

c. Stamens not more than twice as many as the petals.

d. Stamens of the same number as the petals and opposite them.

Herbs with triternate leaves, the leaflets 2-3-lobed; sepals and petals in 2 rows of 3 each, the petals thick and much shorter than the sepals; plant purplish (*Caulophyllum*) ....40. *Berberidaceae*

Herbs with fleshy entire leaves; calyx inferior; sepals 2; petals 5 ....37. *Portulacaceae*

Herbs with simple radical leaves; flowers regular, pentamerous; calyx plaited; ovary 1-celled, 1-seeded ....75. *Plumbaginaceae*

Leafy-stemmed herbs with yellow regular flowers that occasionally have separate petals (*Lysimachia*) ....76. *Primulaceae*

d. Stamens not of the same number as the petals, or if of the same number, alternate with them.

e. Corolla irregular.

Delicate smooth herbs with compound dissected leaves; corolla spurred or saccate at base; stamens in 2 sets; ovary compound, 1-celled..42. *Fumariaceae*

Herbs with 5 sepals, a 1-spurred or gibbous corolla of 5 petals, 5 hypogynous stamens, and fruit a 1-celled, 3-valved pod ....65. *Violaceae*

Succulent herbs with yellowish or orange flowers; sepals and petals coloured alike, one of the former spurred; ovary 5-celled; fruit a pod bursting elastically ....60. *Balsaminaceae*

Plants with simple exstipulate leaves; the lower of 3 petals keel-shaped and often crested on the back; ovary forming a 2-celled, 2-seeded pod ....53. *Polygalaceae*

e. Corolla regular or nearly so.

f. Calyx entirely free from the ovary (ovary superior).

g. Stamens inserted on the receptacle (hypogynous).

h. Leaves simple.

Herbs with pungent juice; petals 4, cruciform; stamens 4 long and 2 short; fruit a silique or silicle (except in *Raphanus*) ....43. *Cruciferae*

Glandular-haired bog herbs with radical leaves; flowers in a 1-sided raceme on a naked scape ....45. *Droseraceae*

Herbs with entire dotted leaves; pod 1-celled, with numerous seeds ....63. *Hypericaceae*

Herbs with stems usually swollen at the joints; leaves opposite and entire; styles 2-5 ....36. *Caryophyllaceae*

Herbs with sessile entire exstipulate leaves and blue pentamerous flowers; stamens monadelphous at the base; pod 10-celled, 10-seeded ....50. *Linaceae*

Herbs with lobed or divided stipulate leaves and pentamerous flowers; deeply lobed ovary with an elongated axis from which, at maturity, the 1-seeded carpels separate (*Geranium*) ....52. *Geraniaceae*

Herbs or shrubs with leaves that are sometimes evergreen, but in certain instances the entire plant is whitish or reddish; anthers opening by terminal pores.....................................73. *Ericaceae*

h. Leaves compound.

Herbs with pungent juice; petals 4, cruciform; stamens 4 long and 2 short; fruit a silique or silicle.......................43. *Cruciferae*

Herbs with pinnate leaves and pentamerous flowers; ovary as in *Geranium* (*Erodium*)..............................52. *Geraniaceae*

Low herbs with sour juice and palmate leaves with 3 obcordate leaflets; stamens 10; styles 5, distinct................51. *Oxalidaceae*

g. Stamens not hypogynous.

h. Stamens inserted on the calyx (perigynous), or inserted on a disk in the bottom of the calyx tube.

i. Leaves simple.

Herbs or shrubs with opposite and alternate, exstipulate leaves; styles or stigmas 2 (4 in *Parnassia*); carpels fewer than the sepals; stamens perigynous..............................47. *Saxifragaceae*

Small fleshy-leaved herbs with symmetrical flowers; sepals 4-5; carpels 5, distinct................................46. *Crassulaceae*

Herbs or slightly woody plants with entire leaves opposite or in whorls of 3; flowers purple, whorled, forming an interrupted spike; calyx enclosing but free from the ovary; stamens perigynous; stigma 1..67. *Lythraceae*

Trees or shrubs with opposite, palmately lobed leaves; fruit two 1-seeded samaras that separate........................59. *Aceraceae*

i. Leaves compound; trees or shrubs with regular pentamerous flowers; stamens on a disk; styles or stigmas 3............57. *Anacardiaceae*

h. Stamens attached at the base of the petals (epipetalous) or free from them in *Nemopanthus;* shrubs with small flowers, the parts mostly in 4's or 6's; fruit a red, 4-8-seeded, berry-like drupe....58. *Aquifoliaceae*

f. Calyx united to the ovary (ovary inferior).

g. Stamens inserted on the calyx (perigynous).

Aquatic herbs; leaves crowded, often whorled, and when immersed dissected; petals 4 (or none); stamens 4-8; stigmas 4; fruit nut-like, 4-celled, deeply 4-lobed (*Myriophyllum*) ....69. *Haloragidaceae*

Herbs with symmetrical perfect flowers; petals 2-4; stamens as many or twice as many as the petals; style 1; stigma 2-4-lobed or capitate ....68. *Onagraceae*

Tendril-bearing herbs with small, whitish, monoecious flowers and prickly fruit ....94. *Cucurbitaceae*

Herbs or shrubs with opposite and alternate exstipulate leaves; styles or stigmas 2; carpels fewer than the sepals...........47. *Saxifragaceae*

Thorny shrubs or trees with simple stipulate leaves; petals on a disk in the calyx tube; stamens 10-20; fruit a reddish pome containing 3-5 bony nutlets (*Crataegus*)...................................48. *Rosaceae*

g. Stamens not inserted on the calyx, but on the ovary or on a disk that covers the ovary (epigynous).

Herbs with small flowers chiefly in compound umbels; calyx minute; petals 5; stamens 5; styles 2, surrounded by a fleshy disk; fruit dry, 2-seeded ....71. *Umbelliferae*

Plants with alternate compound leaves; flowers in simple umbels or panicles; styles usually more than 2; fruit a drupe.......70. *Araliaceae*

Shrubs or trees (rarely herbs) with simple leaves; petals 4 or 5; style 1; fruit a 1-2-seeded drupe ....72. *Cornaceae*

b. Corolla with petals more or less united.

c. Calyx entirely free from the ovary (ovary superior).

d. Stamens more numerous than the lobes of the corolla.

e. Herbs or shrubs with papilionaceous corollas; stamens usually 10, monadelphous or diadelphous; carpel 1-celled forming a legume..49. *Leguminosae*

e. Delicate smooth herbs with compound dissected leaves; corolla spurred or saccate at the base; ovary compound, 1-celled............ 42. *Fumariaceae*

e. Plants in some cases with evergreen leaves; in *Rhododendron* the stamens sometimes as few as the lobes of the corolla; anthers opening by terminal pores ....73. *Ericaceae*

d. Stamens not more numerous than the lobes of the corolla.

e. Stamens of the same number as the corolla lobes.

f. Stamens opposite the corolla lobes; herbs with simple leaves and regular flowers; stamens inserted on the corolla; style 1; stigma 1; ovary 1-celled ....76. *Primulaceae*

f. Stamens alternate with the lobes of the corolla.

g. Ovaries more than 1, or, if 1, deeply 4-lobed.

Plants with acrid milky juice and pentamerous and pentandrous flowers; anthers of the stamens slightly adherent to the stigma; filaments distinct; ovaries 2..79. *Apocynaceae*

Plants with milky juice and flowers in umbels; anthers of the stamens connected with the stigma; filaments united ....80. *Asclepiadaceae*

Herbs with square stems, opposite aromatic leaves and didynamous stamens or only 2; fruit consisting of 4 seed-like nutlets around the base of the style ....84. *Labiatae*

Usually rough-hairy herbs with alternate leaves and regularly 5-lobed corolla (except in *Echium*); stamens 5, epipetalous; fruit as in *Labiatae* ....83. *Boraginaceae*

g. Ovary only 1, not deeply lobed.

h. Ovary 1-celled; smooth herbs with bitter juice and usually simple leaves (in *Menyanthes* of 3 leaflets) ....78. *Gentianaceae*

h. Ovary 2-10-celled.

Tall woolly herbs with sessile leaves; corolla rotate, somewhat irregular, with 5 stamens inserted on its tube; ovary 2-celled (*Verbascum*).... ....86. *Scrophulariaceae*

Herbs with ribbed radical leaves and small spiked flowers on a naked scape; stamens 4 (rarely 2) attached to corolla; capsule 2-celled, the top coming off like a lid ....89. *Plantaginaceae*

Herbs with regular pentamerous and pentandrous flowers; ovary 3-celled; style 3-lobed ....82. *Polemoniaceae*

Chiefly twining or trailing herbs with pentamerous and pentandrous flowers; capsule 2-celled, 4-seeded; style 2-cleft ....81. *Convolvulaceae*

Rank-scented herbs with regular pentamerous and pentandrous flowers; style and stigma 1; fruit a 2-5-celled, many-seeded capsule or berry ....85. *Solanaceae*

Plants with leaves that are sometimes evergreen (*Pterospora* is purplish brown); petals nearly separate in *Ledum*; anthers opening by terminal pores or longitudinal slits; style 1; capsule 5-celled......... ....73. *Ericaceae*

Dwarf woody evergreen, with small entire crowded coriaceous leaves; corolla bell-shaped, 5-lobed, the lobes rounded; ovary 3-celled, few seeded ....74. *Diapensiaceae*

e. Stamens fewer than the corolla lobes.

f. Corolla regular; herbs with square stems and opposite leaves; stamens 2; fruit consisting of 4 seed-like nutlets around the base of the style (*Lycopus*) ....84. *Labiatae*

f. Corolla irregular.

Herbs with square stems and opposite aromatic leaves; stamens didynamous or only 2; fruit consisting of 4 seed-like nutlets around the base of the style ....84. *Labiatae*

Aquatic herbs; calyx and corolla 2-lipped, the latter personate and spurred at the base; stamens 2 ....87. *Lentibulariaceae*

Herbs parasitic on roots and destitute of green foliage; stamens didynamous; corolla ringent and more or less 2-lipped.........88. *Orobanchaceae*

Herbs with 2-lipped corolla (nearly regular in *Veronica*); stamens 4, didynamous or rarely 2 ....86. *Scrophulariaceae*

c. Calyx united to the ovary (ovary inferior).
  d. Stamens more or less united by their anthers.
    Tendril-bearing herbs with small whitish monoecious flowers and prickly fruit ....94. *Cucurbitaceae*
    Flowers in a dense head on a common receptacle, surrounded by an involucre; fruit a seed-like achene ....97. *Compositae*
    Herbs with acrid milky juice and scattered flowers; corolla irregular, 5-lobed and split down one side ....96. *Lobeliaceae*
  d. Stamens not united together in any way.
    e. Stamens inserted on the corolla (epipetalous).
      Coarse prickly herbs with opposite or whorled exstipulate leaves; flowers in dense involucrate heads; stamens 4..........93. *Dipsacaceae*
      Herbs with opposite exstipulate leaves; flowers in cymose clusters; calyx limb of plumose bristles; stamens 1-3, fewer than the corolla lobes..........92. *Valerianaceae*
      Herbs or shrubs with opposite stipulate or whorled exstipulate leaves; stamens alternate with the mostly 4 lobes of the corolla ....90. *Rubiaceae*
      Shrubs, rarely herbs, with opposite exstipulate leaves (*Viburnum* sometimes with appendages that are evidently stipules); corolla tubular or rotate..........91. *Caprifoliaceae*
    e. Stamens free from the corolla or nearly so.
      Herbs with milky juice and scattered flowers; corolla regular, 5-lobed; stamen 5 ....95. *Campanulaceae*
      Somewhat shrubby plants; anthers opening by pores; fruit edible and berry-like ....73. *Ericaceae*

Division I. **PTERIDOPHYTA**

[Marie-Victorin: Les Filicinées du Québec; Contrib. Lab. Bot. Univ. Montréal, No. 2, 1923. Weatherby: A list of varieties and forms of the ferns of eastern North America; Amer. Fern Journ. 25: 45-51, 95-100, 1935; 26: 11-16, 60-69, 94-99, 131-136, 1936; 20-24, 51-56, 1937. Broun: Index to North American ferns; Orleans, Mass. 1938. Friesner: Key to species and varieties of ferns of northeastern North America; Butler Univ. Bot. Studies 4: 141-162. 1940. Scamman. Ferns and fern allies of New Hampshire. N. H. Acad. Sci. Bull. 2: 1-100. 1947.]

1. POLYPODIACEAE

(Fern Family)

a. Sori enclosed in globular or necklace-like parts of the much modified contracted fertile fronds.
  b. Sterile fronds simply pinnatifid, with netted veins; fertile fronds 2-pinnate; rootstocks creeping ....1. *Onoclea*
  b. Sterile fronds 2-pinnatifid, growing in a crown, the veins free; fertile fronds 1-pinnate; rootstocks short, erect ....2. *Pteretis*
a. Sori exposed or simply covered by the reflexed margin of the frond; fertile and sterile fronds foliaceous, alike.
  b. Sori marginal, the indusium appearing to consist of the reflexed margin of the frond; rootstocks creeping.
    c. Sori apparently continuous along the whole margin, at least in age.
      d. Fronds very large, broadly triangular, ternate, the branches 2-pinnate..........3. *Pteridium*

d. Fronds small, ovate-oblong.
  e. Fronds delicate, membraneous; revolute margins of the fertile fronds scarcely modified; ultimate segments of the sterile fronds broader..4. *Cryptogramma*
  e. Fronds coriaceous; stipes purplish brown, very wiry; segments of the fertile fronds lance-linear, very acute; sterile and fertile fronds not very dissimilar ....5. *Cheilanthes*

c. Sori several or many, distinct.
  d. Sori sublunate, at the tips of the fan-shaped pinnules; fronds pedate...6. *Adiantum*
  d. Sori as broad as long, marginal or partly covered by a reflexed tooth of the incised pinnule in addition to the true cup-shaped indusium; fronds 2-pinnate ....7. *Dennstaedtia*

b. Sori dorsal, though sometimes near the margin; indusium independent of the margin of the frond.
  c. Sori oblong or linear, straight or curved.
    d. Fronds small, evergreen, linear, 1-pinnate with rounded pinnæ; stipes brownish or purplish black, filiform or nearly so; sori and indusia straight or rarely somewhat curved; cliffs ....8. *Asplenium*
    d. Fronds larger and broader, deciduous, 2-pinnatifid or 2-pinnate, the pinnæ lanceolate; stipes green or greenish, not filiform; sori and indusia straight or reniform ....9. *Athyrium*
  c. Sori orbicular or nearly so.
    d. Indusium wholly or partly inferior; fronds not evergreen.
      e. Indusium inferior, cleft into narrow segments ....10. *Woodsia*
      e. Indusium attached at the side and enclosing the sorus like a hood .... 11. *Cystopteris*
    d. Indusium superior or wanting; fronds often evergreen.
      e. Fronds articulated with the creeping rootstocks, 1-pinnatifid, the divisions confluent at the base; sori naked, large, midway between midrib and margin ....12. *Polypodium*
      e. Fronds not articulated, 1-3-pinnate, if 1-pinnate the divisions distinct.
        f. Indusium wanting; sori small, orbicular, borne on the back of the veins below the apex ....13. *Phegopteris*
        f. Indusium present.
          g. Indusium reniform or orbicular, with a narrow sinus by which it is attached to the frond ....14. *Dryopteris*
          g. Indusium orbicular, peltate, fixed by the centre ....15. *Polystichum*

1. ONOCLEA L.

1. O. sensibilis L. Sensitive Fern

Low meadows and thickets (Bic; Rim.; Mtn.; Ann.; Drt.; Dou.; Mal.; Pcé.; God.; New Carlisle; PCa.; GCa.). Common and generally distributed.

(Boreal-)temperate American: Sask. to Mingan Is. and Nfld., southw. to Texas and Fla.; e. Asia.

Forma *obtusilobata* (Schkuhr) Gilbert, with sterile and fertile types of fronds intergrading, has been collected near Grand Lac Matane.

2. PTERETIS Raf.

1. P. pensylvanica (Willd.) Fernald, *See* Rhod. 47: 123. 1945. (*Onoclea Struthiopteris* of Gray's Man., ed. 7; *P. nodulosa* (Michx.) Nieuwl.) Ostrich Fern

Thickets and open woods (Bic; Rim.; Ann.; Drt.; Dou.; Mal.; Pcé.; God.; New Carlisle; PCa.; GCa.). General in its habitat.

(Boreal-)temperate circumpolar: s. and central Alaska, n. B.C., Alb., Sask., Man., s. James Bay, Mingan Is., and Nfld., southw. to S. Dak., Mo. and Va.; Eurasia.

Forma *pubescens* (Terry) Fernald, with rhachis canescent-tomentulose rather than glabrous and lustrous (*See* Rhod. 37: 219. 1935) has been collected from Canton Cuoq, Matane co.

3. PTERIDIUM Scop.

1. **P. aquilinum** (L.) Kuhn, var. **latiusculum** (Desv.) Underw. (*Pteris aquilina* of Gray's Man., ed. 7; *See* Tryon, Rhod. 43: 41-48. 1941.) Bracken Fern

Thickets and fields (Bic; Rim.; Drt.; Dou.; Mat.); subalpine woods (Bln.). General in its habitat.

(Boreal-)temperate ? circumpolar; gap in western N.A.; Wyo. to Minn. and Nfld., southw. to Colo., Ark., Miss. and N.C.; Eurasia (large gaps between western and eastern areas).

4. CRYPTOGRAMMA R. Br.

1. **C. Stelleri** (Gmel.) Prantl. Slender Cliff Brake

Calcicole: sea cliffs (Bic; Gro.; Prr.; Plr.; For.; Pcé.); river ledges (Mtn.; Ann.; Lou.; Ren.; Drt.; Bon.).

Boreal ?circumpolar: Alaska, Yukon and Alb. to Lab. and Nfld., southw. to Wash., Colo., Iowa, and N.J.; gap in Europe; Asia.

5. CHEILANTHES Sw.

1. **C. siliquosa** Maxon. (*Pellaea densa* (Brack.) Hook.; *Cryptogramma densa* (Brack.) Diels.) Oregon Cliff Brake. Indian's Dream

Dry alpine serpentine barrens and talus (Alb.).

Disjunct American, alpine: B.C. to Calif., Wyo., and Utah; Great Lakes region; Que. (Megantic and Gaspe cos.).

6. ADIANTUM (Tourn.) L.

a. Pinnæ strongly curved; stipe 2-5 dm. high; pinnules green, their teeth rounded; sori linear or short-oblong, usually more than twice as long as broad; rhizome horizontal ....1. *A. pedatum*

a. Pinnæ strongly ascending; stipes very stiff, glaucous, rarely more than 2 dm. high; pinnules bluish green, more deeply cleft, the teeth more acute and often very fine; sori markedly crescent-shaped, rarely twice as long as broad; rhizome suberect..1a. *A. pedatum*, var. *aleuticum*

1. **A. pedatum** L. Maidenhair Fern

Woods (Rim.; Gnd.; Mat.).

Boreal American: Aleutian Is. and s. coast of Alaska to Nfld., southw. to Calif., Utah, Kans., La., and Ga.; e. Asia.

1a. **A. pedatum,** var. **aleuticum** Rupr., *See* Fernald, Rhod. 7: 190-192. 1905.

Dry alpine serpentine barrens and talus (Alb.); gravel outwash plain below Mt. Albert (R. du Diable).

Disjunct American, alpine: Alaska to Calif. and the Rocky Mts.; e. and s. Que. to Nfld., southw. to Vt.; e. Asia (Japan).

7. DENNSTAEDTIA Bernh.

1. **D. punctilobula** (Michx.) Moore. (*Dicksonia punctilobula* (Michx.) Gray.) Hay-scented Fern

Cliffs near Salmon R. (Bic); rich woods below Mt. Albert (R. du Diable).

Temperate eastern American: Minn. to e. Que., southw. to Mo. and Ga.; isolated in Ark.

8. ASPLENIUM L.

a. Fronds pale green, softly herbaceous; stipe brownish, passing into a green herbaceous rhachis; pinnæ round-ovate or ovate-rhomboid, crenately toothed........1. *A. viride*

a. Fronds dark green and more rigid; stipe and rhachis purplish black and shining; pinnæ roundish-oblong or oval, entire or crenulate, obliquely wedge-truncate at base ....2. *A. Trichomanes*

1. **A. viride** Huds. Green Spleenwort

Calcicole: sea cliffs (Bic; Mtn., Srl.; Lou.; Tng.; Lbn.; Pcé.); inland cliffs (Tra.); river ledges (Rim.; Ann.; Ren.; Gnd.; Bon.; GCa.); subalpine rocks (Alb.; Log.; Pem.; Nic.).

Arctic circumpolar: Alaska, Mack., Sask., Ellesmere, Lab., and Nfld., southw. in the mts. to Oreg., Wyo., S. Dak., and Vt.; Greenland; arctic Eurasia.

2. **A. Trichomanes** L. Maidenhair Spleenwort

Calcicole: south-facing cliffs (Bic Mt.); sea cliffs (Lou.); river ledges (Rim.; Ann.).

Boreal circumpolar: Alaska and Hudson Bay region to e. Que., southw. to Ariz. and Ga.; Faeroes; Eurasia; S. Am.; Africa; Australia.

9. ATHYRIUM Roth

[Butters: The genus Athyrium and the North American ferns allied to Athyrium Filix-femina; Rhodora 19: 170-197. 1917.]

a. Sori and indusia at least in part reniform or horseshoe-shaped, frequently crossing the veinlets; fronds 2-pinnate, the pinnules pointed at the tip, incised or pinnatifid, with irregular sharp teeth.

  b. Fronds from bipinnate-pinnatifid to nearly 4-pinnate, the ultimate lobes linear or linear-lanceolate, not close together; sori chiefly submarginal, the indusium evanescent ....1. *A. alpestre,* var. *gaspense*

  b. Fronds bipinnate to tripinnatifid; indusium permanent.

    c. Rootstock erect; fronds tapering about equally from the centre, the lower pinnæ much reduced, distant; new growth arising from the centre of the crown of fronds ....2. *A. Filix-femina,* var. *sitchense*

c. Rootstock horizontal or oblique; fronds loosely clustered, relatively broader below, the new growth arising in front of the old.

d. Young indusia glandular-ciliate; fronds broadest near the base, the lower pinnæ little reduced ....2a. *A. Filix-femina,* var. *asplenioides*

d. Indusia not glandular; pinnæ somewhat reduced below..2b. *A. Filix-femina,* var. *Michauxii*

a. Sori and indusia straight, silvery when immature; fronds 1-pinnate, the pinnules pinnatifid, rounded at the tip, with blunt teeth...............3. *A. thelypteroides*

1. **A. alpestre** (Hoppe) Rylands, var. **gaspense** Fernald, Rhod. 30: 48. 1928.

Alluvium of alpine brooks and alpine meadows (Tlb.) (type station, including specimens distributed as the western var. *americanum*).

Local endemic, alpine: with *A. alpestre,* and var. *americanum,* boreal circumpolar.

2. **A. Filix-femina** (L.) Roth, var. **sitchense** Rupr. (*A. cyclosorum* Rupr. in part; *A. sitchense* Rupr.)

Alpine meadow (Tbl.); thickets and wet rock slides near base (Col.).

Disjunct American, alpine: Aleutian Is. and Alaska to Calif.; Gaspe Pen. and Nfld.; with the species, boreal circumpolar.

2a. **A. Filix-femina,** var. **asplenioides** (Michx.) Farwell

Thickets and woods (Bic; Rim.; Mét.; Cap Chat; Lac à Foin; Dou.; GCa.); subalpine woods (Log.).

(Boreal-)temperate eastern American: Minn. to Côte Nord and Nfld., southw. to S. Dak., Tex., and Fla.

Forma *rubellum* Farwell (*A. angustum,* var. *rubellum* (Gilbert) Butters), with pinnules lanceolate, membranous wings along rhachis of pinnæ obscure or wanting, is the plant represented in the above collections.

2b. **A. Filix-femina,** var. **Michauxii** (Spreng.) Farwell

Boreal eastern American, alpine: Lab. and Nfld. to Me., N.H., and Mass. Represented in Gaspe by the following forms:

Forma *laurentianum* (Butters) Fernald (*See* Rhod. 48: 389. 1946), with sori separate at maturity, has been collected on the gravel shores of York River and on alpine bogs and slopes (Alb.; Tbl. (type station of *A. angustum,* var. *rubellum* (Gilb.) Butters); Log.; Bln.).

Forma *confertum* (Butters) Fernald (*See* Rhod. 48: 389. 1946), with sori confluent at maturity over the lower surface of the pinnule, has been collected in boggy subalpine woods of Tabletop Mountain, the type station of *A. angustum,* f. *confertum* Butters.

3. **A. thelypteroides** (Michx.) Desv. (*A. acrostichoides of* Gray's Man., ed. 7; *Diplazium thelypteroides* (Michx.) Presl.)

Woods (Bic; Rim.; Cap Chat; Prr.; Pcé.; GCa.; Mat.); subalpine woods near timber-line (Alb.).

Temperate eastern American: Minn. to e. Que., southw. to Mo., Ala., and Ga.; e. Asia.

10. WOODSIA R. Br.

a. Stipes not articulated near the base; cilia of the indusium very short, hidden by the sporangia; segments crenate-serrulate.
  b. Plant loosely hispidulous with minute white hairs and finely glandular-puberulent; fronds lanceolate, tapering from about the middle to both ends; pinnæ oblong-ovate .... 1. *W. scopulina*
  b. Plant glabrous; fronds bright green, soft in texture, elliptic-lanceolate; pinnæ triangular-oblong, the teeth or margin nearly always reflexed; indusium divided to centre into beaded hairs .... 2. *W. oregana*

a. Stipes obscurely articulated near the base; cilia of the indusium inflexed over the sporangia.
  b. Fronds smooth and naked throughout, linear or linear-oblong and very delicate, often tapering both ways; sori few .... 3. *W. glabella*
  b. Fronds sparsely to densely chaffy.
    c. Fronds oblong-lanceolate, thickly clothed beneath as well as the stalk with rusty bristle-like chaff; pinnæ crowded, oblong, sessile; marginal sori somewhat confluent in age .... 4. *W. ilvensis*
    c. Fronds narrowly lanceolate, the lower surface only sparsely scaly.
      d. Pinnæ rather distant, oblong, deeply pinnatifid or partly pinnate; sori somewhat confluent in age .... 5. × *W. gracilis*
      d. Pinnæ triangular-ovate, pinnately 5-7-lobed, the lobes nearly entire; sori non-confluent; stipes and rhachis reddish-brown, shiny, with only a few chaffy scales .... 6. *W. Belli*

1. **W. scopulina** D. C. Eaton.

Calcicole: sea cliffs (Trl.; Srl.; Marsouins; Mrn.; Val.; Ren.).

Disjunct American: Alaska to Calif. and w. Okla.; Great Lakes region; Gaspe Pen. to Tenn. and N.C.

2. **W. oregana** D. C. Eaton.

Calcicole: sea cliffs and ridges (Bic; Trl.).

Disjunct American: B.C. and Sask. to Calif. and Ariz.; Great Lakes region; e. Que.

3. **W. glabella** R. Br.

Calcicole: sea cliffs (Trl.); river ledges (Ann.; Drt.; Gnd.; Bon.; GCa.; Mat.); inland cliffs (Pcé.); cliffs above lake (Lac à Foin); crevices of rocks (Alb.; Log.; Mtt.).

Arctic circumpolar, alpine: arctic Alaska, Coronation Gulf, Somerset I., Ellesmere, Devon, Baffin, Melville, n. Lab., and Nfld., southw. to B.C., Alb., Minn., and N.Y.; Great Lakes region; Greenland; Iceland; Spitzbergen; arctic and alpine Eurasia.

4. **W. ilvensis** (L.) R. Br. Rusty Woodsia

Calcicole: sea cliffs (Bic; Rim.; Gro.; Cap.; Ann.; Trl.; Srl.; Marsouins; For.; New Carlisle); river ledges (Cap Chat; Gnd.); cliffs above lake (Lac Pleureuse); subalpine rocks (Tbl.; Log.; Mtt.; Ftn.; Nic.).

Serpentine cliffs of Coulée des Fourches (Alb.).

Arctic circumpolar, alpine: Alaska, Yukon, Mack. (Great Bear L., Great Slave L.), Keewatin, island in Hudson Str., Baffin, n. Lab., and Nfld., southw. to Iowa and N.C.; w. and e. Greenland; Iceland; arctic and alpine Eurasia.

5. × **W. gracilis** (Lawson) Butters; *See* Amer. Fern Journ. 31: 15. 1941. (*W. ilvensis*, var. *gracilis* Lawson; *W. alpina* × *ilvensis* Rosendahl; *See* Weatherby, Amer. Fern Journ. 26: 11. 1936; 31: 62. 1941.)

Calcicole: river ledges (Drt.) (type station).

Temperate eastern American: Minn., Gaspe, and Vt.

6. **W. Belli** (Lawson) A. E. Porsild, Rhod. 47: 147-148. 1945. (*W. alpina* of Gray's Man., ed. 7; *W. glabella*, var. *Belli* Lawson.)

Calcicole: sea cliffs (Bic; Srl.; For.); river ledges (Rim.; Ann.; Marsouins; Drt.; Gnd.; Bon.; GCa.); alpine cliffs (Alb.; Tbl.).

(Arctic-)boreal eastern American, alpine: Lake Superior to n. Lab. and Nfld., southw. to Vt., and in the mts. to N.Y.; closely related to the arctic circumpolar *W. alpina* (Bolton) S. F. Gray, from which it differs in its non-confluent sori and reddish brown, shiny stipes and rhachis, which are almost completely devoid of chaffy scales.

11. CYSTOPTERIS Bernh.

a. Fronds deltoid-lanceolate to oblong-lanceolate, 2-3 pinnate.
b. Frond deltoid-lanceolate, elongate, attenuate, 2-pinnate, the basal pair of pinnæ the largest; rhachis and pinnæ often bearing bulblets underneath, wingless; indusium short, truncate on the free side..........................1. *C. bulbifera*
b. Frond oblong-lanceolate, 2-3-pinnate; secondary rhachises usually winged; indusium tapering or acute at the free end.
c. Pinnules irregularly pinnatifid or cut-toothed.
d. Plant about 2·5 dm. high; indusium glabrous....................2. *C. fragilis*
d. Plant larger, up to 5 dm. high; indusium sparsely and minutely glandular on the back..................................2a. *C. fragilis*, var. *laurentiana*
c. Pinnules incised with longish and spreading teeth....2b *C. fragilis*, var. *angustata*
a. Fronds deltoid-ovate, 3-4-pinnate, often subternate (resembling those of *Phegopteris Dryopteris*); basal pair of pinnæ much the largest, unequally deltoid-ovate..3. *C. montana*

1. **C. bulbifera** (L.) Bernh. Bladder Fern

Calcicole: sea cliffs (Bic; Mét.; Srl.; Lbn.; Pcé.; Car.; Irn.); river ledges (Rim.; Mtn.; Ann.; Lou.; Ren.; Drt.; PCa.; GCa.; Mat.).

(Boreal-)temperate American: Man. to Mingan Is. and Nfld., southw. to Ariz. and Ga.

2. **C. fragilis** (L.) Bernh. Fragile Fern

Calcicole: sea cliffs (Bic; Gro.; Trl.; Srl.; Plr.; Lbn.; For.; Dou.; Pcé.; Bon. I.; Mar.); river ledges (Rim.; Ann.; Drt.; Gnd.; Bon.; Pab.); subalpine cliffs (Alb.; Lac Ste. Anne, Tbl.).

Arctic circumpolar: Aleutian Is., Alaska, Yukon, n. coast of Mack., Victoria I., Ellesmere, n. Lab., and Nfld., southw. to s. Calif., Tex., Mo., and Ga.; Greenland; Iceland; Faeroes; Spitsbergen; arctic and alpine Eurasia; also in the southern hemisphere.

2a. **C. fragilis,** var. **laurentiana** Weatherby, Rhod. 28: 129-131. 1926; 37:373-378. 1935.

Calcicole: sea cliffs (Bic; Trl.; Srl.; Plr.; Lbn.; Bon. I.); river ledges (Cap Chat; Ann.; Ruisseau à Rebours).

(Boreal-)temperate eastern American: e. Que. to Nfld. and Cape Breton I.; Great Lakes region.

2b. **C. fragilis,** var. **angustata** Lawson, Can. Nat. N. S. 1: 287. 1864.
Calcicole: river ledges (Ann.; Gnd.).
Gaspe endemic.

3. **C. montana** (Lam.) Bernh. (Britton & Brown 1: 15; Rydberg 1042.) Mountain Bladder Fern.

Calcicole: river ledges (Ann.; Gnd.; GCa.); woods by alpine streams (Alb.; Tbl.).

Boreal ?circumpolar, alpine: Alaska, Yukon, Mack., n. shore of Lake Superior, Lab. and Nfld., southw. to B.C., Lake Mistassini, and Gaspe Peninsula; isolated in Colo.; s. Greenland; w. Europe (alpine); Himalaya Mts.; Kamtchatka.

12. POLYPODIUM (Tourn.) L.

1. **P. virginianum** L. (*P. vulgare* of eastern Am. authors, not L.; *See* Fernald in Rhod. 24: 125-142. 1922.) Polypody

Shaded and mossy boulders and rocks (Bic; Mtn.; Lac à Foin; Ann.; Drt.).

Boreal American: (gap in western N.A., where replaced by *P. vulgare* L. and vars.); Mack. (Great Slave L.), Hudson Bay (Churchill), s. Lab., and Nfld., southw. to Ark. and Ga.

13. PHEGOPTERIS Fée

a. Fronds 2-pinnatifid, triangular; pinnæ all sessile, adnate to the winged rhachis, the lowest pair deflexed and standing forward........................1. *P. polypodioides*
a. Fronds ternate with the three divisions petioled; rhachis wingless.
  b. Divisions subequal, often deflexed at right angles to the stipe; fronds glabrous ....2. *P. Dryopteris*
  b. Terminal division largest, erect, the fronds thus appearing pinnate; fronds minutely glandular, somewhat rigid, dull green..........................3. *P. Robertiana*

1. **P. polypodioides** Fée. (*P. connectilis* (Michx.) Watt; *Dryopteris Phegopteris* (L.) C. Chr.; *See* Rhod. 43: 219. 1941.) Beech Fern

Woods (Bic; Rim.; Mét.; Trl.; Lou.; Mad.; For.; Pcé.; PCa.; GCa.; Irn.); subalpine woods (Alb.; Tbl.; Bln.). General in its habitat.

(Arctic-)boreal circumpolar: Aleutian Is., Alaska, n. Sask., middle Hudson Bay, n. Lab., and Nfld., southw. to Wash., Minn., Ohio, and Va., and mts. of Tenn. and N.C.; w. and e. Greenland; Iceland; Faeroes; arctic and alpine Eurasia.

2. **P. Dryopteris** (L.) Fée. (*Dryopteris Linnaeana* C. Chr.; *D. disjuncta* (Rupr.) Morton; *See* Rhod. 43: 217. 1941.) Oak Fern

Woods (Bic; Rim.; R. Blanche; Drt.; Irn.); subalpine woods (Alb.; Bln.). General in its habitat.

Boreal circumpolar: Aleutian Is., Alaska, Yukon, Mack. to Lab. and Nfld., southw. to Oreg., New Mex., S. Dak., and mts. of Va.; w. and e. Greenland; Iceland; Faeroes; Eurasia.

3. **P. Robertiana** (Hoffm.) A. Br. (*Dryopteris Robertiana* (Hoffm.) C. Chr.)

Calcicole: wet red sandstone river bluffs (Bon.).

Boreal circumpolar: Alaska, Yukon, Mack., n. Sask., n. shore Lake Superior, Mingan Is., and Nfld., southw. to Iowa and N.B.; Eurasia.

14. DRYOPTERIS Adans.

(*Aspidium* Sw.; *Thelypteris* Schmidel)

a. Veins once forked; fronds not evergreen; stipes and slender rootstocks nearly naked; segments oblong, entire, obtuse or appearing acute when in fruit from the strongly revolute margins..1. *D. Thelypteris,* var. *pubescens*

a. Veins more than once forked; fronds mostly evergreen; stipes and rootstocks scaly.
  b. Pinnæ 40-60, very small, 4-8 mm. broad; fronds glandular and aromatic..2. *D. fragrans,* var. *remotiuscula*
  b. Pinnæ fewer, larger, 1·2-9 cm. broad.
    c. Sori marginal; fronds smooth, thickish, subcoriaceous; pinnules oblong, sometimes slightly falcate, obtuse, entire or crenate..................3. *D. marginalis*
    c. Sori not marginal.
      d. Basal scales lance-linear, caudate-attenuate; pinnules oblong, very obtuse, serrate at the apex and obscurely so at the sides, the basal incisely lobed, distinct, the upper confluent....................................4. *D. Filix-mas*
      d. Basal scales lance-oblong, ovate-oblong, or deltoid, not attenuate.
        e. Fronds 2-pinnatifid to 2-pinnate.
          f. Indusium glandular-puberulent; pinnules sharply spinulose-serrate..5. × *D. Boottii*
          f. Indusium smooth; pinnules finely serrate or cut-toothed......6. *D. cristata*
        e. Fronds 3-pinnatifid to 4-pinnate; lobes of the pinnules spinulose-dentate.
          f. The first pair of pinnules on the upper and lower sides of the lowermost pinnæ 0·5-2 cm. apart, the pinnule on the lower side farthest from the rhachis and usually exceeding the pinnule next to it..7a. *D. spinulosa,* var. *americana*
          f. The first pair of pinnules on the upper and lower sides of the lowermost pinnæ nearly opposite, rarely more than 4 mm. apart.
            g. Midrib of pinnæ not glandular; indusia not glandular; the first pinnule on the lower side of the lowermost pinnæ longer than the one next to it ....7. *D. spinulosa*
            g. Midrib of pinnæ glandular near base; indusia glandular; the first pinnule on the lower side of the lowermost pinnæ not longer than the one next to it; pinnæ usually tapering abruptly to a long narrow point ....7b. *D. spinulosa,* var. *intermedia*

1. **D. Thelypteris** (L.) Gray, var. **pubescens** (Lawson) Nakai, Bot. Mag. Tokyo 45: 97. 1931. (*Aspidium Thelypteris* of Gray's Man., ed. 7.) Marsh Fern

Swampy ground (Bic; Mal.; Mar.; Bon.; Car.). General in its habitat.

(Boreal-)temperate eastern American: Man. to Nfld., southw. to Tex. and Fla.; e. Asia; with the species, boreal circumpolar (gap in western N.A.).

2. **D. fragrans** (L.) Schott, var. **remotiuscula** Komarov. (*Thelypteris fragrans,* var. *Hookeriana* Fernald, Rhod. 25: 3. 1923; 44: 138. 1942.) Fragrant Fern

Calcicole: sea cliffs (Bic); inland cliffs (Tra.); river ledges (Rim.; Ann.; Bon.; Mat.); cliffs in woods below mountain (Alb.).

Boreal American: Yukon, Mack., Sask., Minn., Côte Nord, and Nfld., southw. to Vt. and N.Y.; e. Asia; with the species, boreal circumpolar.

3. **D. marginalis** (L.) A. Gray. Leather Woodfern

Woods (Bic; Sacré-Coeur; Bon.; Car.). General in its habitat.
Temperate American: B.C. to e. Que., southw. to Okla. and Ga.

4. **D. Filix-mas** (L.) Schott. Male Fern

Calcicole: sea cliffs (Srl.; Plr.; Lbn.; Pcé.; Bon. I.); river ledges (Ren.; Bon.); talus of alpine schists (Log.; Ftn.; Pem.).

Boreal circumpolar: Alaska to Lab. and Nfld., southw. to Calif. and n. Vt.; Greenland; Iceland; Faeroes; arctic Eurasia.

5. × **D. Boottii** (Tuckerm.) Underw. (*D. cristata* × *spinulosa* var. *intermedia* Slosson.)

Damp woods (Bic).

Temperate eastern American: Minn. to e. Que., southw. to Ohio, Pa. and Va.

6. **D. cristata** (L.) A. Gray. Crested Fern

Swampy ground (Bic; Rim.; Bon.; New Carlisle; Mar.); beach (Car.); alluvial woods (Cap Chat; Drt.).

(Boreal-) temperate circumpolar: Sask. to Nfld., southw. to Idaho, Ark., and Va.; Eurasia.

7. **D. spinulosa** (O. F. Mueller) Watt. Spiny Shield Fern

Woods and thickets (Bic; Rim.; Drt.; Dou.; Pcé.; Gnd.; God.; Irn.); subalpine conifer woods (Bln.). General in its habitat.

Boreal circumpolar: Mack. and B.C. to Lab. and Nfld., southw. to Idaho, Mo., and Va.; Greenland; Eurasia.

7a. **D. spinulosa,** var. **americana** (Fisch.) Fernald, Rhod. 28: 146-147. 1926. (*D. campyloptera* (Kunze) Clarkson).

Conifer woods (Bic; For.; Pcé.; Canton Pinault); subalpine conifer woods (Lac Ste. Anne, Tbl.; Alb.; Log.).

(Boreal-) temperate eastern American: James Bay to Gaspe Peninsula and N.S., southw. to Minn. and Va.

7b. **D. spinulosa,** var. **intermedia** (Muhl.) Underw.

Woods (Ann.; Ren.; Pcé.; Irn.); alpine slopes (Alb.).

(Boreal-) temperate eastern American: Wis. to Nfld., southw. to Mo. and N.C.

15. POLYSTICHUM Roth

a. Fronds linear-lanceolate, rigid, simply pinnate; pinnæ broadly lanceolate-falcate, acute, the lowest short-triangular, strongly auricled on the upper side, spinulose-dentate ....1. *P. Lonchitis*

a. Fronds 1-pinnate with pinnatifid segments or 2-pinnate.
  b. Fronds 1-pinnate, linear or lanceolate, coriaceous; pinnæ serrate in the outer part with pointed or prickly teeth, pinnately lobed at base, the superior basal lobe the largest ....2. *P. scopulinum*

b. Fronds ovate- or oblong-lanceolate, herbaceous, 2-pinnate; pinnules truncate and almost rectangular at base, sharply toothed, beset with long and soft as well as chaffy hairs ....3. *P. Braunii,* var. *Purshii*

1. P. Lonchitis (L.) Roth. Holly Fern

Calcicole: shaded talus slopes (Bic; Rim.; Prr.; Lbn.; Pcé.; Tra.); river ledges (Rim.); calcareous alpine meadow (Tbl.); alpine slopes (Log.).

Boreal circumpolar, alpine: Aleutian Is., s. Alaska, Yukon, s. Alb., s. Ont., s. Lab., and Nfld., southw. to Calif., Colo., the Great Lakes region, and N.S.; w. and e. Greenland; Iceland; Faeroes; arctic and alpine Eurasia.

2. P. scopulinum (D. C. Eaton) Maxon. (*P. mohrioides,* var. *scopulinum* (D. C. Eaton) Fernald; *See* Rydberg, p. 1043.)

Crevices and talus of alpine serpentine barrens (Alb.).

Disjunct American, alpine: B.C., Wash., and Idaho, southw. in the mts. to s. Ariz. and Calif.; Gaspe Peninsula.

3. P. Braunii (Spenner) Fée, var. **Purshii** Fernald, Rhod. 30: 28-30. 1928. (*P. Braunii* of Gray's Man., ed. 7.)

Calcicole: rich woods and shaded talus slopes (Bic; Rim.; Srl.; Marsouins; Prr.; Lbn.; For.; Pcé.; Pab.; Bon.; GCa.; Car.); subalpine woods (Alb.; Tbl.; Log.; Mtt.; Ftn.).

Disjunct American: Alaska; n. Wis. to Nfld., southw. to Pa. and N.Y.; e. Asia; with the species, boreal circumpolar.

2. OSMUNDACEAE

(Flowering Fern Family)

1. OSMUNDA (Tourn.) L.

a. Fronds bipinnate; fertile pinnules racemose-panicled at the summit of the frond; plant smooth, pale green ....1. *O. regalis,* var. *spectabilis*

a. Fronds once pinnate; pinnæ deeply pinnatifid; plants woolly when young.
  b. Fronds fertile in the middle; sporangia greenish, turning brown..2. *O. Claytoniana*
  b. Fronds of two kinds, the sterile tallest, the fertile appearing earlier from the same rootstock and soon withering; sporangia cinnamon-colour ....3. *O. cinnamomea*

1. O. regalis L., var. **spectabilis** (Willd.) Gray. (*O. regalis* of Gray's Man., ed. 7.) Royal Fern

Border of ponds (Bic; Lac du Club; Cha.); wet ground (Rim.).

(Boreal-)temperate American: Sask. to Nfld., southw. to Tex. and Fla. and into S.A.; with the species, temperate circumpolar.

Forma *anomala* (Farwell) Harris, with some sterile pinnæ in the fertile part and some pinnæ of the sterile part more or less fertile, has been collected from Lac du Club, Matane co.

2. O. Claytoniana L. Interrupted Fern

Roadsides and woods (Bic; Rim.; Cap Chat; Drt.; Dou.; Mal.; Pcé.; God.; New Carlisle); subalpine woods (Alb.; Tbl.; Log.; Mtt.; Bln.).

Boreal eastern American: e. Man. to Côte Nord, s. Lab., and Nfld., southw. to n. Ark., Mo., and Ga.; s. Asia (variety).

3. **O. cinnamomea** L. (*O. cinnamomea*, var. *typica* Fern., Rhod. 32: 75. 1930.) Cinnamon Fern

Swampy ground and thickets (Bic; Rim.; Mtn.; Cap Chat; Drt.; Dou.; Mal.; Pcé.; Bon. I.); alpine serpentine barrens (Alb.).

(Boreal-)temperate eastern American: Minn. to Côte Nord and Nfld., southw. to N. Mex. and Fla.; S.A.; represented in e. Asia (Manchuria and Japan) by var. *asiatica* Fernald.

3. OPHIOGLOSSACEAE

(Adder's Tongue Family)

[Clausen: A monograph of the Ophioglossaceae; Mem. Torrey Bot. Cl. 19: 3-177. 1938.]

1. Botrychium Sw.

(Moonwort. Grape Fern)

a. Sterile blade sessile above the middle of the plant, large, deltoid, ternate, thin or leathery in texture; bud hairy, partly exposed by the sheathing base of the stalk, which is open on one side (subgenus *Osmundopteris*).

  b. Blade large, lax, and membranous, with the pinnæ divided to the midrib, the ultimate divisions toothed or lobed, not overlapping; sporangia 0·5-1 mm. in diameter, with the valves recurving widely in dehiscence.........1. *B. virginianum*

  b. Blade compact and leathery, with the pinnæ not so deeply divided and the ultimate divisions toothed or lobed, often crowded or imbricate; sporangia 0·5-1·8 mm. in diameter, with the valves usually not widespreading or recurving in dehiscence ....1a. *B. virginianum*, var. *europaeum*

a. Sterile blade various, but not as above; bud hairy or smooth, completely enclosed by the sheathing base of the stalk.

  b. Sterile blade 1-7 cm. long, 1-8 cm. wide, ternately decompound, relatively long stalked (the stalks 1-11 cm. long), usually inserted towards base of plant, coriaceous, the ultimate divisions 3-10 mm. long, 3-8 mm. wide, usually somewhat crowded and sometimes overlapping; divisions of the sterile blade commonly obtuse or rounded at tip; plant stout and fleshy, but not extremely so, mostly glabrous; buds commonly hairy, with the leaves sometimes completely reflexed (subgenus *Sceptridium*)..2. *B. multifidum*

  b. Sterile blades usually small, pinnately or palmately divided (simple in *B. simplex*), sessile or short stalked, parting from the common stalk at various heights; buds glabrous, with the leaves erect, partly inclined or completely reflexed (subgenus *Eubotrychium*).

    c. Sterile blade oblong or ovate in outline, sessile or stalked; the fertile and sterile segments in the bud either erect or with their tips variously inclined, but never both completely reflexed.

      d. Both segments of the leaf erect in vernation or the fertile segment erect and the extreme tip of the sterile just slightly inclined over it; blade simple or once pinnate.

        e. Sterile blade sessile or short stalked, with the divisions either imbricate or somewhat remote, usually decidedly flabellate but sometimes obovate or oblong, generally all similar; spores 25-40 mu in diameter.

          f. Spores 25-35 mu in diameter; blade inserted towards the middle of the plant, usually broadly oblong in outline.

            g. Blade coriaceous, with the flabellate divisions often imbricated...3. *B. Lunaria*

            g. Blade membranous, with the flabellate or oblong divisions rather remote...............................3a. *B. Lunaria*, var. *onondagense*

f. Spores 30-40 mu in diameter; blade often inserted somewhat below the middle of the plant, much longer than wide, with the divisions various in shape..................................3b. *B. Lunaria*, var. *minganense*

e. Sterile blade stalked, simple, entire or once pinnate, inserted either basally or suprabasally; sterile segment in vernation either erect or with its tip slightly inclined over the apex of the fertile part; plant stout and leathery; spores 30-45 mu in diameter..................................4. *B. simplex*

d. Fertile segment usually erect in the bud or with the tip slightly inclined towards the sterile; upper part of the sterile part commonly bent down over and covering the fertile segment, its apex regularly clasping the fertile in vernation; sterile blade inserted at various heights, either sessile or short stalked, usually oblong in outline, with the major divisions pinnately divided or crenately lobed; plant lax and membranous or stout and fleshy..5. *B. matricariaefolium*

c. Sterile blade deltoid, usually sessile; fertile and sterile segments both completely reflexed in vernation.

d. Plant stout and fleshy; divisions of blade 1-5 mm. wide; spores averaging 35 mu in diameter...6. *B. lanceolatum*

d. Plant lax and rather membranous; divisions of the blade 1-2·5 mm. wide; spores averaging 30 mu in diameter..6a. *B. lanceolatum*, var *angustisegmentatum*

1. B. virginianum (L.) Swartz. Rattlesnake Fern. Grape Fern

Woods (Bic; Rim.; Trl.; Prr.; Mad.; Drt.; Albertville); river gravel bar (Ann.). General in its woodland habitat.

Temperate American: s. B.C. to Gaspe Peninsula, southw. to Calif. and Fla.; n. India, China, and Japan.

1a. **B. virginianum,** var. **europaeum** Angstr. (Including var. *laurentianum* Butters, Rhod. 19: 208-209. 1917; *See* Weatherby, Amer. Fern Journ. 25: 96-97. 1935, and Clausen, l. c., p. 102).

Woods (Bic; Mét.; Cap Chat; Marsouins; Val.; Ren.; Pcé.; Oie; GCa.; Tra.; Nou.; Mat.). General in its habitat.

Boreal ?circumpolar: Unalaska and s. Mack. to James Bay, Lab., and Nfld., southw. to Wash., Oreg., Colo., Mich., and N. Eng.; n. Eurasia.

2. **B. multifidum** (Gmel.) Rupr. (*B. Matricariae* (Schrank) Spreng.)

Sandy beach, in mat of *Juniperus communis* (Bic); dry sandy places and sterile fields (Cap Chat; Dou.; Gnd.; Mar.; Nou.); slaty ridges (Bic); cedar swamp (Nou.).

Boreal circumpolar: Mack. and Alb. (Lake Athabasca) to Lab. and Nfld., southw. to n. Wis. and N.Y.; Eurasia.

3. **B. Lunaria** (L.) Swartz. Moonwort

Calcicole: sea cliffs (Bic; Gro.; Srl.; Prr.; Plr.; For.; Pcé.; Bon. I.; Gnd.); meadows by sea (Cap Chat); alpine situations (Tbl.; Log.).

Psammophilous halophyte: calcareous beaches and spits (Bic; Cha.; Pas.; Nou.; Car.).

(Arctic-)boreal circumpolar: Aleutian Is., Alaska, Mack., Hudson Bay, n. Lab., and Nfld., southw. to Calif., Ariz., Colo., Minn., Mich., and Vt.; w. and s. Greenland; Iceland; Faeroes; arctic and alpine Eurasia.

Forma *subincisum* (Roeper) Milde, with segments deeply toothed or almost incised, occurs with the species in Europe and America; in Gaspe: (Ann.; Prr.; Pcé.; Car.).

3a. **B. Lunaria,** var. **onondagense** (Underw.) House. (*B. onondagense* Underw.).

Calcicole: sea cliffs and ledges (Bic; Pcé.); river ledges (PCa.; Bon.). Range of the species.

3b. **B. Lunaria,** var. **minganense** (Victorin) Dole. (*B. minganense* Victorin, Contrib. Lab. Bot. Univ. Montréal, No. 11: 331. 1927.)

Calcicole: sea cliffs and ledges (Bic; Prr.); cliffs above lake (Lac Pleureuse); river ledges (PCa.; Bon.); inland cliffs (Pcé.).

Boreal American: Alaska, Yukon, Mack., Hudson Bay (Churchill), James Bay, Lab., southw. to Calif., Nev., Colo., the Great Lakes region, Gaspe, and N.S.

4. **B. simplex** Hitchc. Little Moonwort

Sea cliffs (Pcé.); slaty fields (Bic; Méchins; Cap Chat; Ann.); river mouth (Gnd.); sandy and gravelly beaches (Baie des Sables; Car.).

(Boreal-)temperate circumpolar: B.C., Great Lakes region, Nfld., southw. to Calif. and Md.; s. Greenland; Eurasia.

5. **B. matricariaefolium** Al. Braun. (*B. ramosum* (Roth) Aschers.)

Sea cliffs (Trl.; For.; Pcé., Bon. I.); dry slaty fields (Bic; St. Mathieu); subalpine meadows (Tbl.; Log.).

Boreal circumpolar: gap in western N.A.; Great Lakes region to Lab. and Nfld., southw. to Idaho and Md.; Eurasia.

6. **B. lanceolatum** (Gmel.) Angstr.

Sea cliffs (Bic); alpine meadows and slopes (Tbl.; Log.; Pem.).

Boreal circumpolar, alpine: Aleutian Is., n. Alaska, central Yukon, southw. to Wash., Wyo., and Colo.; Côte Nord and Nfld. to N.J.; w. and e. Greenland; Iceland; Eurasia.

6a. **B. lanceolatum,** var. **angustisegmentatum** Pease & Moore.

Gravelly pasture (Bic).

Boreal circumpolar: Aleutian Is., B.C., and mts. of Wash. and Colo.; Great Lakes region to Lab. and Nfld., southw. to W. Va. and N.J.; n. Eurasia.

4. EQUISETACEAE

(Horsetail Family)

1. EQUISETUM (Tourn.) L.

(Horsetail. Scouring Rush)

[Marie-Victorin: Les Equisétinées du Québec; Contrib. Lab. Bot. Univ. Montréal, No. 9: 1-137. 1927. Schaffner: How to distinguish the North American species of Equisetum; Amer. Fern Journ. 13: 33-40. 1923. Schaffner: Diagnostic key to the species of Equisetum; Amer. Fern Journ. 22: 69-75; 122-128. 1932.]

a. Stems dark green, stiff and harsh, persisting throughout the winter, the sterile and fertile similar, normally unbranched or sparingly branched near the base; spikes tipped with a rigid point.

b. Stems usually tall and solitary, stout, 8-34-grooved; central cavity large, about two-thirds the total diameter; sheaths loose, with two black rings separated by an ashy one, the teeth mostly deciduous ....1. *E. hyemale,* var. *affine*

b. Stems tufted, lower and slender, usually 5-10-grooved.

c. Central cavity none; sheaths 3-toothed with persistent hyaline-bordered filiform-tipped teeth; stems filiform, 7-15 cm. high, flexuous and curving, 6-grooved..2. *E. scirpoides*

c. Central cavity one-third to two-thirds the total diameter.

d. Sheaths campanulate, usually discolouring tardily; stems mostly very slender and tall ....3. *E. variegatum*

d. Sheaths cylindric, tight, often crusty, partly or completely black; stems rather large to medium, sometimes rather slender ....3. *E. variegatum,* var. *Jesupi*

a. Stems generally pliant, bright green or yellowish (sometimes lacking chlorophyll), persisting at latest until the approach of winter; spikes obtuse, not apiculate.

b. Stems of two kinds, the fertile devoid of chlorophyll at least at first, appearing in early spring before the sterile.

c. Fertile stems simple, not becoming green, soon withering; sheaths of branches of sterile stems 3-4-toothed, the teeth triangular-lanceolate, with sharp erect acuminate points.

d. Branches 4-angled, simple, ascending or spreading, of medium length, the sheaths 4-toothed ....4. *E. arvense*

d. Branches 3-angled, the sheaths 3-toothed; stems rather slender ....4a. *E. arvense,* var. *boreale*

c. Fertile stems branched when old, becoming green, only the tip withering; branches usually solid.

d. Branches of the stem simple, generally 3-angled, their sheaths 3-toothed, the teeth deltoid, acute; sheaths of fertile stems with 10-15 flat, whitish, scarious teeth, marked on the back with a brownish line ....5. *E. pratense*

d. Branches compound (rarely simple or nearly so), 4-5-angled, their sheaths 4-5-toothed, the papery brown teeth coherent; sheaths of the branchlets with 3 divergent teeth; none of the teeth with a brownish line ....6. *E. sylvaticum,* var. *pauciramosum*

b. Stems all alike; spores mature in summer; branches simple or none, with a central cavity.

c. Central cavity small, about one-sixth the total diameter; vallecular cavities (under each groove) as large as or larger than the central cavity; stem-sheaths widened upwards and very long; teeth about 8, lance-subulate, black, with broad white margins; branches none or few and irregularly verticillate..7. *E. palustre*

c. Central cavity very large, at least four-fifths the total diameter; vallecular cavities none or greatly reduced and invisible to the naked eye; sheaths appressed; teeth about 18, dark brown, narrow, acute, rigid; stems weak and papyraceous, 30-150 cm. long, bearing on the median and upper nodes verticels of 4-16 ascending or spreading branches ....8. *E. fluviatile*

1. **E. hyemale** L., var. **affine** (Engelm.) A. A. Eaton. (*E. prealtum* Raf.)

River alluvium and damp woods (Bic; Ann.; Drt.; Jhn.; Dan.; Gnd.; PCa.; GCa.; Car.; Nou.).

(Boreal-)temperate eastern American: Great Lakes region to Nfld., southw. to Mo. and Va.; with the species, boreal circumpolar.

Var. *affine,* forma *pumilum* (A.A. Eaton) Victorin, with stems more slender, 8-40 cm. long, 2-3 mm. broad, somewhat cæspitose and decumbent at the base, has been collected from the gravelly beach at Carleton.

2. **E. scirpoides** Michx. Dwarf Scouring Rush

River alluvium (Ann.; Drt.; Bon.; PCa.; Res.); open woods by river (Mtn.); moist woods below limestone cliffs (Bic Mt.); cedar swamp (Car.).

Arctic circumpolar: Alaska, Yukon, Mack. (Mack. R. Delta), Baffin, Hudson Bay, n. Lab., and Nfld., southw. to Wash., S. Dak., and Pa.; w. and e. Greenland; Spitsbergen; arctic and alpine Eurasia.

3. **E. variegatum** Schleich.

River gravels (Drt.; Jhn.; Gnd.; PCa.; Mat.); marly cedar swamp near river mouth (Bon.); clay flats (Res.).

Arctic circumpolar: Aleutian Is., n. coast of Alaska, Yukon, Mack. (Coronation Gulf), Ellesmere, n. Baffin, Melville, n. Lab., and Nfld., southw. to Calif., Colo., and N.J.; w., n., and e. Greenland; Iceland; Spitsbergen; arctic and alpine Eurasia.

Forma *anceps* (Milde) Broun, with central cavity one-sixth the total diameter or less and filiform stems 15-20 cm. long, 1 mm. or less in diameter, strictly erect, has been collected from brackish pools and dead waters near the mouth of Dartmouth River.

3a. **E. variegatum,** var. **Jesupi** A. A. Eaton (*E. hyemale,* var. *Jesupi* (A. A. Eaton) Victorin; *E. trachyodon* A. Br.)

Wet red sandstone river bluffs (Bon.).

Temperate circumpolar: Ont. to e. Que., southw. to Ill. and Conn.; Eurasia.

4. **E. arvense** L. Common Horsetail

Roadside ditch (Bic; Rim.); calcareous talus (For.); river gravels (Gnd.). General.

Arctic circumpolar: Aleutian Is., Alaska, Herschel I., Coronation Gulf, Keewatin, Ellesmere, Devon, n. Baffin, Melville, Hudson Bay, n. Lab., and Nfld., southw. to Calif., Ala., and N.C.; Greenland; Iceland; Faeroes; Spitsbergen; arctic and alpine Eurasia; Africa.

Forma *nemorosum* A. Br., with thick, whitish stems 50-100 cm. long, the branches greener than the stem, elongated, up to 30 cm. long, spreading almost horizontally, has been collected from Ste. Flavie and Métis. This is a shade form frequent in temperate regions.

Forma *ramulosum* (Rupr.) Klinge, with the branches themselves branching, has been collected from Ruisseau Sorel and Lac Pleureuse.

4a. **E. arvense,** var. **boreale** (Bong.) Rupr.

Marly sphagnous swamp at river mouth (Gnd.); edge of river (Ren.); woods (Mad.); gravel flats (Mat.); rocks (Bic); alpine schists (Alb.).

Northern part of the range.

Var. *boreale,* forma *pseudo-alpestre* Victorin, with stems decumbent, the nodes approximate, has been collected from marly alluvium of Grande and Bonaventure Rivers.

Var. *boreale,* forma *caespitosum* J. Rousseau, a cæspitose plant with very short branches, has been collected from sandy flats at the mouth of Matapedia River.

5. **E. pratense** Ehrh.

Rich damp woods (Bic; Cap Chat; Ann.; Lac Mont Louis; Gnd.; PCa.; GCa.; Nou.); sea cliffs (Pcé.); subalpine conifer forests and schists and alluvia (Alb.; Tbl.).

Boreal circumpolar: Bering I.; Alaska, Yukon, James Bay, s. Lab., and Nfld., southw. to Iowa and n. N.J.; Colo.; Greenland; Iceland; Faeroes; arctic Eurasia.

6. **E. sylvaticum** L., var. **pauciramosum** Milde. Wood Horsetail

Conifer woods (Bic; Mét.); salt marsh (Gpe.); alpine meadow (Tbl.); subalpine schists and alluvia (Alb.; Nic.). General.

(Arctic-)boreal American: Yukon and Mack. (Great Bear L.) to n. Lab. and Nfld., southw. to Iowa and Va.; s. Greenland; Europe (rare); e. Asia.

Var. *pauciramosum,* forma *multiramosum* Fernald, with branches themselves branching, is the common southern form of North America, to which some of the specimens cited above belong.

7. **E. palustre** L. (*See* Fernald, Rhod. 49: 278-286. 1947.)

Cedar swamp (Car.); river mouth (Bon.); wet places (Mtn.; Car.).

(Arctic-)boreal circumpolar: Alaska, Mack. (Mack. R. Delta, Great Bear L.), middle Hudson Bay, n. Que., s. Lab., and Nfld., southw. to Oreg., Ill., Pa., and N.J.; Iceland; Eurasia.

8. **E. fluviatile** L. Water Horsetail

Wet places (Bic; Mét.; Marsouins; Mat.). General in its habitat.

Boreal circumpolar: s. Alaska, Yukon, and Mack. to Lab. and Nfld., southw. to Oreg. and Va.; Faeroes; Iceland; Eurasia.

Forma *Linnaeanum* (Doell) Broun (*E. limosum* L.), with stems completely naked or with only a few irregularly distributed and strongly ascending branches, has been collected in several places (Bic; Drt.; Dou.; Gpe.; Mal.; Gnd.; Bon.; PCa.; New Carlisle; Lac Ste. Anne.)

5. LYCOPODIACEAE

(Club Moss Family)

1. LYCOPODIUM L.

(Club Moss)

[Marie-Victorin: Les Lycopodinées du Québec; Contrib. Lab. Bot. Univ. Montréal No. 3: 1-121. 1925. Wilson: The spores of the genus Lycopodium in the United States and Canada; Rhodora 36: 13-19. 1934.]

a. Sporangia borne in the axils of ordinary, dark green, shining leaves, these not aggregated into definite strobili or spikes.
  b. Leaves uniform in length, linear-attenuate to lanceolate, entire; stems erect or slightly decumbent at base, rigid, dichotomous, from a short slender rootstock forming a level-topped tuft.
    c. Leaves appressed, lance-attenuate, dark or pale green or yellowish....1. *L. Selago*
    c. Leaves spreading, often reflexed, linear-attenuate, dark green..1a. *L. Selago,* var. *patens*
  b. Leaves in alternating zones of longer or shorter lengths, serrate or entire; stems ascending, the old elongate bases very persistent.
    c. Leaves serrate, oblanceolate....................................2. *L. lucidulum*
    c. Leaves entire or only slightly serrate, linear or almost..2a. *L. lucidulum,* var. *occidentale*
a. Sporangia borne only in the axils of the upper yellowish, scale-like leaves, which are aggregated into spikes.
  b. Leaves of the ultimate sterile branches in more than 4 ranks, about uniform in length, giving the branch as a whole a nearly cylindrical appearance.
    c. Fertile branches with minute leaves, so that the spikes appear long-peduncled; leaves tipped by a fine bristle.

d. Strobili 1 per peduncle.

e. Peduncles 1-2·5 cm. long; spikes 1·5-3·5 cm. long........................3a. *L. clavatum,* var. *monostachyon*

e. Peduncles 3-15 cm. long; spikes 3·5-11 cm. long........................3b. *L. clavatum,* var. *megastachyon*

d. Strobili 2 per peduncle.

e. Strobili sessile on the peduncle..............................3. *L. clavatum*

e. Strobili on short secondary peduncles (pedicels)........................3c. *L. clavatum,* var. *laurentianum*

d. Strobili 3-5 per peduncle, strongly pedicelled, arising at different levels from the common peduncle, the lower 2-6 cm. below the upper ....3d. *L. clavatum,* var. *subremotum*

c. Fertile branches leafy up to the spikes; leaves acute but not bristle-tipped.

d. Creeping stem deep in the ground, the upright branches repeatedly forked, tree-like; leaves 6-ranked; spikes generally several.

e. Leaves of the two upper and two lower ranks smaller and appressed........................4. *L. obscurum*

e. Leaves equal, erect or incurved..........4a. *L. obscurum,* var. *dendroideum*

d. Creeping stem on or near the surface of the ground, its numerous erect branches mostly subsimple or sparingly forked; leaves 5-ranked; spike solitary.

e. Leaves spreading or reflexed.

f. Leaves lanceolate to oblanceolate, distinctly serrate, thin, those of the fertile branches 5-11 mm. long ....5. *L. annotinum*

f. Leaves linear or lance-attenuate, entire or slightly serrate, thickish........................5a. *L. annotinum,* var. *acrifolium*

e. Leaves appressed, entire or almost so, those of the fertile branches 3-4 mm. long, thick and rigid ....5b. *L. annotinum,* var. *pungens*

b. Leaves of the ultimate branches 4-ranked, those on the sides longer than those on the top and bottom, giving the branch a more or less flattish appearance.

c. Leaves of the ultimate branches adnate for half their length, those of the lateral ranks divergent but with incurved tips; fertile branches 5-10 cm. long.

d. Peduncles 2-3 cm. long; ventral leaves reduced.

e. Plant bushy, with erect branches; leaves only slightly divergent........................6. *L. sabinaefolium*

e. Plant with spreading, fan-shaped branches; leaves very divergent........................6a. *L. sabinaefolium,* var. *patens*

d. Peduncles usually shorter; leaves usually equal ....7. *L. sitchense*

c. Leaves of the ultimate branches adnate for more than half their length; fertile branches 15-30 cm. long.

d. Spikes sessile; leaves of 3 kinds, those of the upper row narrowly ovate, acute, those of the lateral rows thick, asymmetrical, falcate, acute, with decurved tips, those of the under row trowel-shaped ....8. *L. alpinum*

d. Spikes almost always peduncled; none of the rows consisting of trowel-shaped leaves ....GROUP A.

GROUP A

a. Annual innovations absent from tips of terminal branchlets; plant with regular and compact fan-like habit, having the appearance of a small tree; principal stem superficial or somewhat buried; ventral leaves reduced, adnate for most of their length, free only at the tip; spikes 1-6, usually 4 ....9. *L. flabelliforme*

a. Annual innovations occasional at tips of lower branchlets ....9a. *L. flabelliforme,* var. *ambiguum*

a. Annual innovations numerous; main stem more or less buried, sometimes superficial; pedicels of spikes oblique, not bent.

b. Plant irregularly bushy, loosely and openly forked; spikes 1-4; ventral leaves reduced, free only at the tip.

c. Main stem almost superficial; aerial branches 5-10 cm. long.

d. Spikes 2-3, almost sessile on the common peduncle.......10. *L. complanatum*

d. Spike solitary ....10a. *L. complanatum,* var. *canadense*

c. Main stem usually buried; aerial branches 15-35 cm. long; spikes 2-4, the common peduncle 1-2-forked, the pedicels often elongated ....10b. *L. complanatum,* var. *elongatum*

b. Plant with regular and compact fan-like habit, having the appearance of a small tree; spikes generally more than 4.

c. Ventral leaves hardly reduced; branchlets almost tetragonal, erect and bushy; plant strongly glaucous ....11. *L. tristachyum*

c. Ventral leaves reduced, linear-subulate; branchlets compressed-ribbon-shaped; plant hardly or not at all glaucous ....11a. *L. tristachyum,* var. *Habereri*

1. **L. Selago** L. (Including var. *appressum* Desv.) Fir Clubmoss

Sea cliffs (Bic; Gro.; Trl.; Marsouins); alpine cliffs (Alb.; Tbl.; Log.; Ftn.; Bln.; McNab.).

Arctic circumpolar, alpine: Aleutian Is., n. coast of Alaska, Coronation Gulf, Keewatin, Ellesmere, Devon, n. Baffin, Melville, Hudson Bay, n. Lab., Nfld., southw. to Conn., and in the mts. to Oreg., Colo., and N.C.; w. and e. Greenland; Iceland; Faeroes; Spitsbergen; arctic and alpine Eurasia.

1a. **L. Selago,** var. **patens** (Beauv.) Desv.

Slaty sea ridges (Bic); river ledges (Ann.); inland cliffs (Tra.); sea cliffs (Pcé.); alpine cliffs (Alb.).

(Boreal-)temperate eastern American: Wis. to Nfld., southw. to n. Vt.; the temperate or mesophytic form of the species.

2. **L. lucidulum** Michx. Shining Clubmoss

Conifer woods (Bic; Rim.; Val.; Drt.; Dou.; Pcé.; Gnd.; PCa.; Irn.); subalpine conifer woods (Lyl.). General in its habitat.

(Boreal-)temperate ?circumpolar: B.C. to Nfld., southw. to Wash. and N.Eng., and in the mts. to S.C.; gap in Europe; Asia (Japan, China, Himalayas).

2a. **L. lucidulum,** var. **occidentale** (Clute) L. R. Wilson, *See* Rhod. 34: 170. 1932. (*L. lucidulum,* var. *porophilum* Clute.)

Alpine summit (Alb.).

(Boreal-)temperate American: Wash. to Nfld., southw. to Me.

3. **L. clavatum** L. Running Clubmoss

Conifer woods (Bic; Rim.; R. Blanche; Dou.; Nou.).

Boreal circumpolar: Aleutian Is., Alaska from about the Arctic Circle, s. Hudson Bay, Lab., and Nfld., southw. to Oreg., Idaho, Mich., and N.C.; Mex. and S.A.; se. Greenland; Iceland; Faeroes; arctic and alpine Eurasia.

3a. **L. clavatum,** var. **monostachyon** Grev. & Hook.

Alpine summits (Log.).

Northern part of the American range; Greenland.

3b. **L. clavatum,** var. **megastachyon** Fernald & Bissell, Rhod. 12: 53. 1910.

Dry conifer woods (Bic; Dou.; PCa.).

Northeastern part of the American range.

Var. *megastachyon,* forma *furcatum* (Luerss.) Victorin, with 2-forked spikes, has been collected in conifer woods at Bic.

3c. **L. clavatum,** var. **laurentianum** Victorin, Contrib. Lab. Bot. Univ. Montréal No. 3: 23. 1925.

Field near woods (Cld.); conifer woods (Bic; Rim.).

Northeastern part of the American range.

3d. **L. clavatum,** var. **subremotum** Victorin, Contrib. Lab. Bot. Univ. Montréal No. 3: 24. 1925.

Conifer woods (Rim.; Pcé.; Canton Pinault).

Northeastern part of the American range.

Var. *subremotum,* forma *frondescens* (Luerss.) Victorin, with spikes accompanied, near the middle of the peduncle, by leafy branches, is the form represented in the above localities, although the variety also probably occurs.

4. **L. obscurum** L. Groundpine

Slaty sea ridges (Bic); dry conifer woods (R. Blanche; Dou.; Nou.); gravel flats (Yrk.); subalpine woods (Ftn.).

Boreal American: Alaska to Nfld., southw. to Ind. and N.C.; e. Asia.

4a. **L. obscurum** L., var. **dendroideum** (Michx.) D. C. Eaton.

Conifer woods (Bic; Rim.; Drt.; Pcé.). General in its habitat.

Boreal American: westernmost Aleutian Is., Alaska, Yukon, Mack., s. Hudson Bay, ?Baffin, Lab., and Nfld., southw. to Wash., Mont., Ind., Tenn., and mts. of Ala. and N.C.

Var. *dendroideum,* forma *exsertum* Victorin, with spikes exserted on leafy but specialized peduncles 2-5 cm. long, has been collected in conifer woods by Little Cascapedia River.

5. **L. annotinum** L. Bristly Clubmoss

Conifer woods (Bic; R. Blanche; Ann.; Lbn.; For.; Dou.; GCa.; Mat.); alpine summit (Tbl.). General in its habitat.

Arctic circumpolar: Aleutian Is., Alaska, Yukon, Mack., Baffin, Hudson Bay, Lab., and Nfld., southw. to Oreg., Colo., Wis., Pa., and n. N.J.; w. and e. Greenland; Iceland; Faeroes; arctic and alpine Eurasia.

5a. **L. annotinum,** var. **acrifolium** Fernald, Rhod. 17: 124. 1915.

Conifer woods (Rim.; Mat.); subalpine conifer woods (Alb.; Tbl.; Str.).

Boreal eastern American: Great Lakes region; Gaspe Peninsula to s. Lab. and Nfld., southw. to Va.

5b. **L. annotinum,** var. **pungens** (La Pylaie) Desv.

Conifer woods (Rim.; Ann.; Cld.); subalpine conifer woods (Alb.; Tbl.; Log.; Mtt.; Str.; Ftn.; Bln.).

Range of the species.

6. **L. sabinaefolium** Willd. Cedar Clubmoss

Conifer woods (Bic; Rim.; Dou.; GCa.; Nou.); subalpine conifer woods (Alb.; Tbl.).

(Boreal-)temperate eastern American: Great Lakes region; e. Que. to Nfld., southw. to Me.

6a. **L. sabinaefolium,** var. **patens** Victorin, Contrib. Lab. Bot. Univ. Montréal No. 3: 42. 1925.

Conifer woods (Cap Chat; Ann.; Canton Pinault; Mat.); subalpine conifer woods (Tbl.).

Northeastern part of the range.

7. **L. sitchense** Rupr. (*L. sabinaefolium,* var. *sitchense* (Rupr.) Fernald; *See* Rhod. 25: 166-167. 1923.)

Conifer woods (Yrk.; Dou.; Gnd.; Nou.); field (Cld.); subalpine conifer woods (Alb.; Tbl.; Mtt.; Str.; McNab); alpine meadow (Tbl.); peat near summit (Log.); alpine serpentine barrens (Alb.).

Boreal American, alpine: Aleutian Is., Alaska to Lab. and Nfld., southw. to Oreg., Idaho, and the Great Lakes region, and in the mts. to N.Y.; e. Asia.

8. **L. alpinum** L.

Alpine cliffs and meadows (Alb.; Tbl.; Log.); subalpine conifer woods (Alb.; Tbl.).

Arctic circumpolar, alpine: Aleutian Is., Alaska, Yukon, Mack., Baffin, n. Lab., southw. to Wash., Mont., and e. Que.; w. and e. Greenland; Iceland; Faeroes; arctic and alpine Eurasia.

9. **L. flabelliforme** (Fernald) Blanchard. (*L. complanatum,* var. *flabelliforme* Fernald.) Running-pine

Conifer woods (Bic; Rim.; Gaspe Peninsula). General in its habitat.

(Boreal-)temperate eastern American: Minn. to Mingan Is. and Nfld., southw. to Ga.

9a. **L. flabelliforme,** var. **ambiguum** Victorin, Contrib. Lab. Bot. Univ. Montréal No. 3: 65. 1925.

Conifer woods (Bic; Mar.).

Probably range of the species.

10. **L. complanatum** L. Groundpine

Conifer woods (Bic; Rim.; Pointe à la Croix; Amqui). General in its habitat.

Boreal circumpolar: Alaska, Yukon, Mack. (Great Bear L., Great Slave L.), middle Hudson Bay, Lab., and Nfld., southw. to Wash., Idaho, Mich., and Me.; w. and se. Greenland; Eurasia.

10a. **L. complanatum,** var. **canadense** Victorin, Contrib. Lab. Bot. Univ. Montréal No. 3: 70. 1925.

Conifer woods (Bic; Trl.; Cap Chat; Ann.; Cld.; Dou.; Yrk.; Tra.; Nou.).

Throughout the American range; the common form in Quebec.

10b. **L. complanatum,** var. **elongatum** Victorin, Contrib. Lab. Bot. Univ. Montréal No. 3: 72. 1925.

Conifer woods (Bic; Rim.; Trl.; Ann.; Yrk.).

Eastern part of the American range; e. Asia.

Var. *elongatum,* forma *simplex* Victorin, with spikes 1(-2), has been collected in conifer woods at Bic, Tourelle, Ste. Anne des Monts, and Anse au Gascon.

11. **L. tristachyum** Pursh. Groundcedar

Conifer woods (Bic; R. Blanche; Gpe.); sand dunes (Pén.); sea beach (Mét.). General.

Boreal circumpolar: Mack. (Great Bear L.), James Bay, Nfld., southw. to Del. and Me., and in the mts. to Ala. and N.C.; Greenland; Eurasia.

11a. **L. tristachyum,** var. **Habereri** (House) Victorin. (*See* Contrib. Lab. Bot. Univ. Montréal No. 3: 51. 1925.)
Conifer woods (Bic; Drt.; Gpe.).
Quebec to N.Y.

6. SELAGINELLACEAE

(Selaginella Family)

1. SELAGINELLA Beauv.

a. Stems rigid, much branched in close tufts; leaves glaucous, densely appressed-imbricate, linear-lanceolate, minutely ciliate, bristle-tipped; spike strongly 4-angled ....1. *S. rupestris*

a. Sterile stems prostrate, slender, the fertile thicker, ascending, simple; leaves green, lanceolate, acute, spreading, sparsely spinulose-ciliate; spike obscurely 4-angled........................2. *S. selaginoides*

1. **S. rupestris** (L.) Spring. Rock Spikemoss

Dry slaty cliffs (Bic; Sacré-Coeur).

Temperate eastern American: Minn. and Ont. to e. Que., southw. to Mo., n. Ala., and Ga.

2. **S. selaginoides** (L.) Link.

Calcicole: river gravels and ledges (Ann.; Cld.; Mad.; Drt.; Yrk.; Gnd.; Bon.; PCa.; GCa.; Mat.); sea cliffs (Pcé.; Bon. I.); cedar swamp at river mouth (Bon.); calcareous alpine meadow (Tbl.).

Damp mossy rocks below serpentine tableland of Mt. Albert (Lac du Ruisseau du Plaqué-Malade).

(Arctic-)boreal circumpolar, alpine: Aleutian Is., Alaska, Yukon, Mack. (Great Bear L.) to n. Lab. and Nfld., southw. to Idaho and N.H. (reported from Colo.); s. Greenland; Iceland; Faeroes; arctic and alpine Eurasia; all areas scattered and isolated.

7. ISOETACEAE

(Quillwort Family)

ISOETES L.

(Quillwort)

a. Leaves rather blunt; velum covering one-third of the unspotted sporangium; megaspores 600-800 mu in diameter, the lower hemisphere honeycomb-reticulated........................1. *I. macrospora*

a. Leaves finely pointed; velum covering about one-half of the spotted sporangium; megaspores 350-560 mu in diameter, covered with simple or forked spinules........................2. *I. muricata,* var. *Braunii*

1. **I. macrospora** Dur.

Subalpine lakes (Tbl.).

(Boreal-)temperate eastern American: Minn. to Gaspe and Nfld., southw. to N. Eng. and N.Y.

2. **I. muricata** Dur., var. **Braunii** (Dur.) Reed. (*I. Braunii* Dur.; *See* Reed, Amer. Fern Journ. 35: 83. 1945.)

Pond mud (St. Anaclet; Mad.; Val.; Gpe.); subalpine ponds (Tbl.; Mtt.).

Boreal American: Aleutian Is., s. Alaska, Yukon, Mack. (Great Bear L.), s. Lab., and Nfld., southw. to Calif., Colo., n. Ind., Pa., and N.J.; w. and s. Greenland.

Division II. **SPERMATOPHYTA**

Subdivision I. *GYMNOSPERMAE*

[Marie-Victorin: Les Gymnospermes du Québec; Contrib. Lab. Bot. Univ. Montréal No. 10: 1-147. 1927.]

8. TAXACEAE

(Yew Family)

1. TAXUS (Tourn.) L.

1. **T. canadensis** Marsh. [N (Evergreen)] American Yew

Conifer woods (Bic; Grand Lac Matane; Prr.; Mad.; Drt.; PCa.; Cha.; Gpe.). General in its habitat.

Boreal American: Lake Winnipeg, Hudson Bay, Lab., and Nfld., southw. to Iowa and Va.

9. PINACEAE

(Pine Family)

a. Leaves linear or needle-like, more than 1 cm. long, clustered or alternate.
b. Leaves in clusters of 2 or more.
c. Leaves in clusters of 2 or 5, evergreen, the clusters sheathed at the base.. 1. *Pinus*
c. Leaves many in a cluster. deciduous, the cluster without a sheath........2. *Larix*
b. Leaves attached singly to the branches.
c. Leaves 4-angled, not appearing 2-ranked; leaf-traces prominent; cones drooping, not falling apart at maturity..3. *Picea*
c. Leaves flat, appearing 2-ranked, whitened along 2 lines underneath; leaf-traces not prominent; cones erect, the axis persistent after the fall of the scales; buds resinous...4. *Abies*

a. Leaves scale-like or awl-shaped, 1 cm. long or less, opposite or whorled.
b. Fruit a small dry cone of 8-12 scales; branchlets flattened; erect tree......5. *Thuja*
b. Fruit berry-like, blue; branchlets not flattened; depressed shrubs......6. *Juniperus*

1. PINUS (Tourn.) L.

(Pine)

a. Leaves 5 in a cluster; cone-scales thin..................................1. *P. Strobus*

a. Leaves 2 in a cluster; cone-scales thickened at the end.
b. Leaves 10-15 cm. long; cones terminal or almost, ovoid.............2. *P. resinosa*
b. Leaves 2-3 cm. long; cones lateral at maturity, conic, recurved against the branch ....3. *P. Banksiana*

1. **P. Strobus** L. [MM (Evergreen)] Northern White Pine

Sterile soils (Bic; Cap Chat; Ann.; Lou.; Drt.; Yrk.; Gnd.; Bon.; PCa.; Lac Ste. Anne, Tbl.).

(Boreal-)temperate American: Man. to Mingan Is. and Nfld., southw. to Iowa and Pa., and along the mts. to Ga.

2. **P. resinosa** Ait. [MM (Evergreen)] Red Pine

Sterile soils (Bic; Bon.).

(Boreal-)temperate American: Man. to Nfld., southw. to Wis., Pa., and Mass.

3. **P. Banksiana** Lamb. [MM (Evergreen)] Jack Pine

Sterile soils (Bic; Mont Joli).

Boreal American: Yukon, Mack., Hudson Bay (Churchill), Côte Nord, and Nfld., southw. to n. Ill. and n. N.Y.

2. LARIX (Tourn.) Adans.

1. **L. laricina** (DuRoi) Koch. [MM] Larch. Tamarack

Cold swamps and heath bogs (Bic; Mét.; Mal.; Sayabec); alpine bog (Alb.).

(Arctic-)boreal American: Alaska, Yukon, Mack. (Mack. R. Delta, Great Bear L.), Hudson Bay, Ungava, n. Lab., and Nfld., southw. to ne. B.C., n. Alb., central Sask., Man., Minn., Pa., and N.J.

3. PICEA Link

a. Branchlets glabrous; cones cylindrical, about 5 cm. long, deciduous; scales 60-90, still soft at maturity...1. *P. glauca*

a. Branchlets pubescent; cones ovoid, 2-3 cm. long, persisting for several years; scales about 30, rigid at maturity...2. *P. mariana*

1. **P. glauca** (Moench) Voss. [MM (Evergreen)] (*P. canadensis* (Mill.) BSP.) White Spruce

General. According to Halliday and Brown (Ecology 24: 358, fig. 2. 1943), this species, together with the black spruce, shows a population intensity in the forests of interior Gaspe (including Shickshock Mountains) of over 61 per cent, and in the surrounding area of 31-60 per cent.

(Arctic-)boreal American: s. Alaska, Yukon, Mack. (Mack. R. Delta, Great Bear L.), Hudson Bay, Ungava Bay, n. Lab., and Nfld., southw. to B.C., Wyo., Wis., and N.Y., and in the mts. to N.C.

Forma *parva* (Vict.) Fernald & Weatherby, a depressed shrub with irregular branching, the branchlets very numerous and crowded, has been collected at Bic and La Madeleine.

2. **P. mariana** (Mill.) BSP. [MM (Evergreen)] Black Spruce

General. *See* above note on population intensity.

(Arctic-)boreal American: Alaska, Yukon, Mack. (Mack. R. Delta, Great Bear L.), Hudson Bay, n. Lab., and Nfld., southw. to central Alb., s. Man., Minn., and N.J., and in the mts. to N.C.

Forma *semiprostrata* (Peck) Blake, a depressed shrub with a twisted trunk and strong short branches, and leaves only 3-6 mm. long, is reported from our area (Marie-Victorin, l.c., 1927).

Forma *empetroides* Victorin & Rousseau, a completely depressed shrub with slender stems and branches, affecting the habit of *Empetrum*, the leaves only 3-6 mm. long, has been collected on the bare alpine summit of Mt. Sterling, the type station.

4. ABIES (Tourn.) Hill

(Fir)

a. Bracts with an abrupt slender point, shorter than the scales............1. *A. balsamea*

a. Bracts with a spreading exserted awn ....1a. *A. balsamea,* var. *phanerolepis*

1. A. balsamea (L.) Mill. [MM (Evergreen)] Balsam Fir

General. According to Halliday and Brown (Ecology 24: 365, fig. 6. 1943), this species has a population intensity in the forests of Gaspe of over 31 per cent.

Boreal American: Yukon, n. Alb., James Bay, Lab., and Nfld., southw. to s. B.C., Alb., Sask., Iowa, Mass., and in the mts. to Va.

1a. **A. balsamea,** var. **phanerolepis** Fernald, Rhod. 11: 203. 1909.

Woods (Bic; Cap Chat; Irn.; Val.; Pcé. (type station)); subalpine woods (Log.; Nic.).

(Boreal-)temperate eastern American: e. Que. to Nfld., southw. to Me.

5. THUJA L.

1. **T. occidentalis** L. [M-MM (Evergreen)] White Cedar. Arbor Vitae

Calcicole (*See* Fernald, Rhod. 21: 41-67. 1919): sea cliffs (Bic; Prr.; Plr.; Pcé.); river gravels and ledges (Drt.; R. Portage; Bon.; PCa.); cedar swamps (Bic; Mét.; Mal.; Bon.; Car.); subalpine slopes (Alb.).

(Boreal-)temperate American: central Man. to James Bay, Lake Albanel, Que., Gaspe, and Anticosti, southw. to Minn. and Pa., and in the mts. to N.C.

Forma *gaspensis* Victorin & Rousseau, with foliage restricted to the ends of the branches, has been collected from river gravels of the type station on Little Cascapedia River.

Forma *prostrata* Victorin & Rousseau, with trunk twisted, decumbent, up to 2 m. long and 15 cm. diameter, has been collected from the dry calcareous slaty talus of Mont St. Pierre, the type station.

6. JUNIPERUS (Tourn.) L.

(Juniper)

a. Catkins berry-like, axillary; leaves in whorls of 3, free and jointed at base, linear-subulate, prickly-pointed.

  b. Plant decumbent, forming large mats; leaves 8-13 mm. long, straight or nearly so, sharp-pointed..1. *J. communis,* var. *depressa*

  b. Very depressed and trailing; leaves 6-9 mm. long, 1·6-2 mm. wide, boat-shaped, curved, subappressed, short-pointed................1a. *J. communis,* var. *montana*

a. Catkins berry-like, terminal; leaves opposite, scale-like, acutely cuspidate, appressed-imbricated, 1-3 mm. long......... ....2. *J. horizontalis*

1. **J. communis** L., var. **depressa** Pursh. [Ch (passive) Evergreen]

Sea cliffs and slaty fields (Bic; For.; Pén.; Mal.; Pcé.; Car.); river gravels (Drt.); sandy beach (Bic).

Boreal American: B.C., Great Lakes region, e. Que., Lab., and Nfld., southw. to Utah, Ind., and N.Y.; with the species and var. *montana,* boreal circumpolar. According to Böcher (Meddel. om. Groenl. 106: 61. 1938), the chromosome number is 12, whereas that of the type species is 11. The collective species is the only American gymnosperm found also in Europe.

1a. **J. communis,** var. **montana** Ait. (*J. nana* Willd.; *J. sibirica* Burgsd.)

Dry slaty talus (Prr.; Pcé.); alpine situations (Tbl.; Log.; Mtt.; Pem.).

Alpine serpentine barrens (Alb.).

(Arctic-)boreal circumpolar, alpine: Alaska, Yukon, Mack., middle Hudson Bay (w. and e. coasts), n. Lab., and Nfld., southw. to n. Mass.; Greenland; Faeroes; arctic Eurasia.

2. **J. horizontalis** Moench [Ch (passive) Evergreen]

Sea cliffs (Bic; Prr.; Mad.; Pcé.; Bon. I.; New Carlisle); calcareous gravels of spits (Car.; Pas.).

Boreal American: se. Alaska, Yukon, Mack. (Mack. R. Delta, Great Bear L.), Great Lakes region, James Bay, Lab., and Nfld., southw. to Colo., Wyo., N.Y., and Vt.; *See* Fassett, Bull. Torrey Bot. Club 72: map p. 481. 1945.

Forma *alpina* (Loud.) Rehd., with leaves awl-shaped, 4-5 mm. long, and end branchlets partly erect, has been collected at Bic, Percé, and Anse à l'Ours.

Subdivision II. *ANGIOSPERMAE*

Class I. **MONOCOTYLEDONEAE**

10. TYPHACEAE
(Cat-tail Family)

1. Typha (Tourn.) L.
(Cat-tail)

1. **T. latifolia** L. [Hel]

Swamps and pond borders (Bic; Drt.; Mal.; Newport; Car.). General in its habitat.

Boreal circumpolar: central Alaska, ?Mack., James Bay, e. Que., and Nfld., southw. to Mex., Tex., and Fla.; Eurasia.

11. SPARGANIACEAE
(Bur-reed Family)

1. Sparganium (Tourn.) L.

[Fernald: Notes on Sparganium; Rhod. 24: 26-34. 1922.]

a. Stigmas 2, filiform; achenes sessile, squarish across the top, nearly equalled by the sepals; inflorescence compound; plants large and stout..........1. *S. eurycarpum*

a. Stigma 1, linear to ovate; achenes tapering at each end, exceeding the sepals, mostly stalked.

b. Beak of the achenes long and slender; stipe 1-4 mm. long; staminate heads 2-many; inflorescence simple or branching.

c. Beak of the reddish brown achene long and very curved; stigma short-oblong; sepals attached near the base of the stipe; leaves all floating, translucent, loosely cellular-reticulate ....2. *S. fluctuans*

c. Beak of the achene straight or nearly so; stigma linear; sepals attached near the top of the stipe; leaves erect or floating.

d. Pistillate heads or branches borne directly in the axils of the leaves; achenes not ribbed at the summit ....3. *S. americanum*

d. Pistillate heads or branches usually borne some distance above the leaf axils.

e. Plants usually with erect leaves; achenes ribbed plainly at the summit, with beaks about the length of the body.

f. Pistillate heads 2-4, well separated, 1·5-2·7 cm. in diam.; staminate part of the inflorescence 2-10 cm. long, of 4-9 heads ....4. *S. chlorocarpum*

f. Pistillate heads 1-3, the upper touching each other, 1-2·2 cm. in diam.; staminate part of the inflorescence 1-4 cm. long, of 2-5 heads ....4a. *S. chlorocarpum* var. *acaule*

e. Plants with usually floating leaves; achenes obscurely or not ribbed; beak shorter than the body.

f. Leaves 1·5-4 mm. wide, rounded on the back; pistillate heads 1·3-2 cm. in diam.; nerves on the underside of the leaf 0·2-0·8 mm. apart...5. *S. angustifolium*

f. Leaves 5-10 mm. wide, flat on both sides; pistillate heads 2-2·5 cm. in diam.; nerves on the underside of the leaf 0·8-2 mm. apart...6. *S. multipedunculatum*

b. Beak of the achene short, conical, 0·5-1·5 mm. long; staminate head 1; pistillate heads all borne directly in the leaf axils; plant small..............7. *S. minimum*

1. **S. eurycarpum** Engelm. [Hel] Giant Bur-reed

Swamps (Bic; Rim.; Cha.); salt marsh (Bic).

Boreal American: Mack. (w. of Great Bear L.), n. Alb., s. Sask., s. Man., s. Ont., e. Que., and Nfld., southw. to Calif., Ariz., Okla., Mo., and Va.; Fla.

2. **S. fluctuans** (Morong) Robinson. [HH]

Marly pond (Oie).

(Boreal-)temperate eastern American: Minn. to Nfld., southw. to Wis., Pa., and N.J.

3. **S. americanum** Nutt. [Hel] *See* Clausen, Rhod. 39: 189. 1937.

Marly pond (Lac Porc-Epic, Bic); swamp by sea (Cha.).

(Boreal-)temperate eastern American: Minn. to Nfld., southw. to Mo. and Fla.

4. **S. chlorocarpum** Rydb. [Hel]

Mud flats of rivers (Mad.; Dou.; PCa.; Albertville; Zén.).

(Boreal-)temperate eastern American: Ont. to Nfld., southw. to Iowa, Ind., and N.J.

4a. **S. chlorocarpum,** var. **acaule** (Beeby) Fernald.

River gravels (Drt.; Dou.; Pcé.; R. Ouest).

Range of the species, but commoner northward, and extending southward to Va.

5. **S. angustifolium** Michx. [HH]

River gravels (Ann.); marly ponds (Lac Porc-Epic, Bic; Mét.; Val.; Tng.; Gnd.; Cha.; Oie; Res.); subalpine lake (Lac des Américains, Tbl.).

Boreal circumpolar: Alaska, Yukon, Mack. (Mack. R. Delta, Great Bear L.), ?middle Hudson Bay, Lab., and Nfld., southw. to Calif., Nev., Utah, Colo., Ill., Ind., Pa., and N.J.; s. Greenland; Iceland; Faeroes; Eurasia.

6. **S. multipedunculatum** (Morong) Rydb. [HH]

River mouth (Pab.).

Boreal American: Alaska, Mack. (Great Bear L., Great Slave L.), James Bay, s. Lab., and Nfld., southw. to Calif., Utah, Colo., N.H., and N.S.

7. **S. minimum** Fries. [HH]

Ponds and swamps (Gnd.; Cha.; Bon.; Oie).

Boreal circumpolar: Alaska, Yukon, n. Alb., n. Sask., James Bay, Côte Nord, and Nfld., southw. to Calif., Utah, Colo., Wis., Mich., Ohio, Pa., and N.J.; w. Greenland; Iceland; Eurasia.

12. NAIADACEAE
(Pondweed Family)

- a. Pistil formed of a single carpel or of several carpels united.
  - b. Pistils and stamens alternate in 2 vertical rows on the inner side of a leaf-like enclosed spadix; stigmas 2, linear; leaves alternate; stem creeping; plants of saline waters............1. *Zostera*
  - b. Pistil naked; plants dioecious, the flowers axillary; the single stamen enclosed in a membranous spathe; leaves opposite; stems floating; plants of fresh waters............2. *Naias*
- a. Pistil formed of separate carpels.
  - b. Flowers monoecious; stamen single; fruit definitely pedicelled and rather long-beaked, the body 2·5-3·5 mm. long; leaves opposite, capillary; plants of brackish waters............3. *Zannichellia*
  - b. Flowers perfect; stamens more than 1; leaves alternate.
    - c. Stamens 2; ovaries 4, becoming stipitate; plants of brackish or saline waters............4. *Ruppia*
    - c. Stamens 4; ovaries 4, sessile; upper leaves often floating; plants of fresh waters............5. *Potamogeton*

1. ZOSTERA L.
(Eel Grass. Grass Wrack)

1. **Z. marina** L., var. **stenophylla** Asch. & Graebn. [HH] (*Z. marina* of Gray's Man., ed. 7; *See* Fernald, Rhod. 35: 92. 1933.)

Halophyte: shallow water near coast (Rim.; Drt.; Pcé.; Gnd.; New Carlisle; Car.); tidal mud flats (Bic); pools in salt marsh (Pas.). General in its habitat.

Boreal circumpolar (maritime): Aleutian Is., Alaska, Hudson Bay, s. Lab., and Nfld., southw. along the coasts to Calif. and Fla.; s. Greenland; Faeroes; Iceland; n. Eurasia. Typical *Z. marina* is the coarser plant of w. European and Mediterranean waters, with thinner and subtransparent leaves up to 12 mm. wide.

2. NAIAS L.

(Naiad)

1. **N. flexilis** (Willd.) Rostk. & Schmidt. [HH]

Marly ponds (Cha.; Oie); pond (Amqui); river (Mad.).

Boreal American: B.C. to Lab. and Nfld. (gap in continental America), southw. to Mo. and S.C.; relic in Europe.

3. ZANNICHELLIA (Mich.) L.

(Horned Pondweed)

1. **Z. palustris** L., var. **major** (Boen.) Koch. [HH] (*Z. palustris* of Gray's Man., ed. 7; *See* Rhod. 23: 110, footnote 2. 1921.)

Halophyte: brackish waters of river estuaries (Jhn.; Dan.; Bon.; PCa.); pool in salt marsh (Bic). General in its habitat.

Boreal eastern American (maritime): e. Que. to Nfld., southw. to Fla.; James Bay; with the typical European plant (fruits sessile or subsessile, the body of the achene 2-2·5 mm. long), boreal circumpolar.

4. RUPPIA L.

(Ditch Grass)

[Fernald and Wiegand: The genus Ruppia in eastern North America; Rhod. 16: 119-127. 1914.]

a. Carpels ovoid, slightly oblique but not strongly eccentric nor curved, bluntish or not tapering to a conspicuous beak; pedicels (podogynes) 1-6 mm. long, distinctly longer than the carpels; peduncles 2-10 mm. long........1. *R. maritima,* var. *intermedia*

a. Carpels strongly eccentric and distinctly beaked, or semilunate or curved.
  b. Mature pedicels 1-3 cm. long; mature peduncles 0·5-3 cm. long..1a. *R. maritima,* var. *rostrata*
  b. Mature pedicels 2-6 mm. long; mature peduncles 0·5-1·5 cm long...1b. *R. maritima,* var. *subcapitata*

1. **R. maritima** L., var. **intermedia** (Thed.) Asch. & Graebn. [HH]

Halophyte: pools in salt marsh (Bic).

(Boreal-)temperate circumpolar (maritime): Wash. to Calif.; e. Que. and Nfld.; Europe; the whole species cosmopolite.

1a. **R. maritima,** var. **rostrata** Agardh.

Halophyte: pools in tidal marshes (Bic; Ann.; Yrk.; Bon.).

(Boreal-)temperate circumpolar (maritime): B.C. to Côte Nord and Nfld., southw. to Mexico; Eurasia; one of the maritime elements in the flora of the Great Lakes.

1b. **R. maritima,** var. **subcapitata** Fernald & Wiegand, Rhod. 16: 126. 1914.

Halophyte: pools and streams in salt marshes (Bic; Bon.; Pas.).

Boreal eastern American (maritime): Lab. and e. Que., southw. to P.E.I. and Mass.

5. Potamogeton (Tourn.) L.
(Pondweed)

[St. John: A revision of the North American species of Potamogeton of the section Coleophylli; Rhod. 18: 121-138. 1916. Fernald: The linear-leaved North American species of Potamogeton, section Axillares; Mem. Gray Herb. 3: 1-183. 1932. Ogden: the broad-leaved species of Potamogeton of North America north of Mexico; Rhod. 45: 57-105; 119-163; 171-214. 1943.]

a. Stipules united with the sheathing base of the leaf; leaves at most 1 mm. wide.

b. Style wanting; fruit beakless.

c. Mature spike elongate, moniliform, 1·5-5 cm. long; upper verticels mostly remote..1. *P. filiformis*

c. Mature spike 0·5-2·5 cm. long, the upper verticels mostly approximately, the lower at most 7 mm. apart....................1a. *P. filiformis,* var. *borealis*

b. Style slender, incurved, persistent as a beak on the mature fruit....2. *P. pectinatus*

a. Stipules axillary and free from the leaf.

b. Submersed leaves without blades, almost filiform; floating leaves 5-10 cm. long, elliptical or ovate, somewhat cordate at base, obtuse but with a blunt point; stipules 4-7 cm. long, acute..3. *P. natans*

b. Submersed leaves with blades.

c. Submersed leaves broad..GROUP A.

c. Submersed leaves linear, 0·1-5 mm. wide (-10 in *P. epihydrus*)......GROUP B.

GROUP A

a. Submersed leaves with clasping bases; floating leaves absent.

b. Leaves 10-30 cm. long, only slightly clasping, lanceolate, rounded and hood-shaped at the tip; stipules 2-3 cm. long; stem whitish; fruit 4-5 mm. long, sharply 3-keeled; peduncles 15-60 cm. long...............................4. *P. praelongus*

b. Leaves 1-10 cm. long, strongly clasping, obtuse or acute, their margins with microscopic denticles; stipules 1-2 cm. long; stem green; fruit 2·5-4 mm. long, obscurely 3-keeled.

c. Stipules 1-2 cm. long, persisting as shreds; leaves lance-attenuate; fruit 3·5-4 mm. long; peduncles spongy, clavate, 1·5-25 cm. long; spikes 1·5-3·5 cm. long...5. *P. Richardsonii*

c. Stipules short and inconspicuous; leaves suborbicular to oblong-lanceolate; fruit 2·5-3·2 mm. long; peduncles slender; spikes 0·7-2 cm. long.

d. Stem 1-2 mm. in diameter; leaves 1·5-3 cm. wide, 11-21-nerved, 5-7 nerves prominent..6. *P. perfoliatus*

d. Stem 0·4-1·5 mm. in diameter; leaves 0·5-2 cm. wide, 7-17-nerved, 1-5 nerves prominent..............................6a. *P. perfoliatus,* var. *bupleuroides*

a. Submersed leaves petioled or tapering to a sessile base, scarcely clasping; floating leaves present or absent.

b. Submersed leaves 3-8 cm. wide, 30-40-nerved, lanceolate or oval, acute at each end, falcate, usually much recurved; floating leaves (seldom present) 30-55-nerved; fruit 4-5·5 mm. long, 3-keeled; peduncles often clavate, up to 30 cm. long...7. *P. amplifolius*

b. Submersed leaves less than 3 cm. wide, 3-18-nerved; floating leaves with fewer nerves.

c. Submersed leaves green, narrowly elliptic to oblanceolate, 1·5-4·5 cm. long, sessile, 5-7-nerved, their margins with strongly developed microscopic denticles; floating leaves (if present) elliptic; fruit 2·5 mm. long; peduncles clavate; spikes 1-3 cm. long; 1-2 carpels developed in each flower.........8. *P. gramineus*

c. Submersed leaves reddish; floating leaves spatulate, remote, reddish; fruit 2·7-3 mm. long; seeds smooth, hard, tawny-olive in colour; 3-4 carpels developed in each flower.

d. Submersed leaves oblong-linear to linear-lanceolate, 7-25 cm. long, usually more than 8 times as long as broad, tapering to an obtuse or acutish apex..9. *P. alpinus*, var. *tenuifolius*

d. Submersed leaves oblong to ovate-oblong, 4-10 cm. long, usually less than 8 times as long as broad, the apex rounded and sometimes slightly hood-shaped ....9a. *P. alpinus*, var. *subellipticus*

GROUP B

a. Submersed leaves 1-10 mm. broad, delicate and ribbon-like; floating leaves, if present, 2-8 cm. long, 0·4-3·5 cm. broad, 7-41-nerved, oblong to elliptical, gradually tapering into the petioles, rounded at tip or abruptly blunt-mucronate, coriaceous; stipules of submersed leaves free, convolute or flat, hyaline; fruits round-obovoid, strongly flattened, 3-keeled when dry, pitted on the sides, 2·5-4·5 mm. long, with subapical minute tooth-like beak.

b. Submersed leaves 0·5-1 cm. broad, 7-13-nerved, not conspicuously distichous; blades of the floating leaves elliptic to broadly oblong-oblanceolate, bluntly cuspidate or merely rounded at tip, 3-8 cm. long, 1·5-3·5 cm. broad, 19-41-nerved; fruiting spikes 1·8-4 cm. long; fruits 3-4·5 mm. long, 3-3·6 mm. broad, with dorsal keel 0·6-1·2 mm. broad...............................10. *P. epihydrus*

b. Submersed leaves 2-8 mm. broad, 5-7-nerved, strongly distichous and rather crowded on new shoots; blades of the floating leaves narrowly oblong or oblong-lanceolate, rounded at tip, 2-7·5 cm. long, 0·4-2·5 cm. wide, 11-33-nerved; fruiting spikes 0·8-3 cm. long; fruits 2·5-3·5 mm. long, 2-3 mm. broad, with dorsal keel 0·2-1 mm. broad...............................10a. *P. epihydrus*, var. *Nuttallii*

a. Submersed leaves 0·1-5 mm. broad; floating leaves absent; spikes 2-30 mm. long, more or less elongated; fruits plump or slightly compressed and definitely beaked (if strongly compressed and essentially beakless only 1-2·2 mm. long).

b. Leaves 9-35-nerved; stem strongly flattened (large diameter 0·7-3·2 mm.); verticels of spike 7-11; peduncle exceptionally stout, 1-1·6 mm. thick...11. *P. zosteriformis*

b. Leaves 1-7-nerved.

c. Stipules connate, forming cylinders with margins united at least below the middle, in age rupturing and often shredded at tip.

d. Leaves usually without basal glands; peduncles 4-10 mm. long, clavate; spikes dense, short-cylindric to subcapitate, with 1 or 2 verticels; fruits 1·8-2·5 mm. long, compressed..................12. *P. foliosus*, var. *macellus*

d. Leaves often with a pair of basal glands; peduncles filiform, 1·5-8 cm. long; spikes interrupted; fruits plump, 2-3 mm. long; winter buds axillary along the branches as well as terminal ....13. *P. pusillus*

c. Stipules flat or convolute, the margins often inrolled but not connate; leaves obtuse or acute but not setaceous.

d. Leaves 2-4 mm. wide, reddish or yellowish, rounded at tip; spike thick-cylindric and closely-flowered, dense in fruit; fruits 3-4 mm. long...14. *P. obtusifolius*

d. Leaves 0·3-2·4 mm. wide, mostly rounded or obtuse; fruits 2-2·5 mm. long.

e. Midrib bordered on each side by 1 row (sometimes 2 at base) of lacunæ; foliage mostly dark green to light green; spikes subcapitate, with 1-2(-3) verticels.

f. Principal leaves 3-7 cm. long............15. *P. Berchtoldi*, var. *mucronatus*

f. Principal leaves 0·8-2·5 cm. long......15a. *P. Berchtoldi*, var. *polyphyllus*

e. Midrib bordered on each side by 2-4 bands of lacunæ; foliage yellowish.......................................15b. *P. Berchtoldi*, var. *colpophilus*

1. **P. filiformis** Pers. [HH]

Calcicole: submerged river gravels and mud flats (Drt.; Jhn.; PCa.); marly ponds (Tng.; Oie; Mar.).

Halophyte: brackish water at river mouth (Dan.).

(Arctic-)boreal circumpolar: Alaska (Seward Pen. and Kotzebue Sd.), Alb., Hudson Bay (Churchill), e. Que., southw. to Nev. and Vt.; Greenland; Iceland; Eurasia; Africa; Australia.

1a. **P. filiformis,** var. **borealis** (Raf.) St. John.

Calcicole: submerged river gravels and mud flats (Ann.; Mad.; Drt.; Yrk.; Jhn.; Bon.; PCa.; GCa.); marly ponds (Tng.; Gnd.; Cha.; Oie).

Halophyte: brackish water at river mouth (Jhn.; Bon.).

(Arctic-)boreal circumpolar: Aleutian Is., Alaska, Yukon, Mack., s. Hudson Bay, n. Que., and Nfld., southw. to Colo., Mich., Pa., and N.Y.; w. and e. Greenland; Iceland; Faeroes; n. Eurasia.

2. **P. pectinatus** L. [HH]

Ponds (Drt.; Mal.; Bon.; Mar.; Nou.).

Halophyte: brackish pools in salt marshes (Mtn.; Jhn.; Bnc.).

Boreal circumpolar: s. Alaska, central Yukon, Mack. (Mack. R. Delta), n. Alb., n. Sask., James Bay, Côte Nord, and Nfld., southw. to Calif., Tex., and Fla.; S. Am.; Eurasia; Africa.

3. **P. natans** L. [HH]

Marly ponds (Lac Porc-Epic, Bic; St. Anaclet; Gnd.; Cha.; New Carlisle; Oie; Mar.).

(Boreal-)temperate circumpolar: s. Alaska, Great Lakes region, Mingan Is., and Nfld., southw. to Calif., Pa., and n. N.J.; Greenland; Iceland; Faeroes; Eurasia; S. Am.; Africa; Australia.

4. **P. praelongus** Wulf. [HH]

River flats (Lou.); marly ponds (Lac Porc-Epic, Bic; Lac du Club; Lac Anse à la Loutre; Oie); calcareous lake (Lac Pleureuse); subalpine lake (Lac Ste. Anne).

Boreal circumpolar: Aleutian Is., Alaska, Mack., James Bay, s. Lab., and Nfld., southw. to Calif., Utah, Wyo., Ind., and N.J.; Iceland; Faeroes; Eurasia.

5. **P. Richardsonii** (Bennett) Rydberg. [HH] (*P. perfoliatus* L., var. *Richardsonii* Bennett.)

Submerged river gravels (Rim.; PCa.); marly pond (Lac Porc-Epic, Bic); lake water (Lac Pleureuse; Lac au Saumon).

Boreal American: Aleutian Is., Alaska, Yukon, Mack. (Mack. R. Delta, Great Bear L.), Sask., Man., James Bay, s. Lab., southw. to Calif., Utah, Nebr., Mass., and Vt.

6. **P. perfoliatus** L. [HH]

Lake waters (Lac Pleureuse).

Boreal circumpolar: Aleutian Is. and s. coast of Alaska; gap in western America; s. Lab. and e. Que., southw. to N.B.; Iceland; Faeroes; Eurasia; n. Africa; Australia.

6a. **P. perfoliatus,** var. **bupleuroides** (Fernald) Farwell. [HH] (*P. bupleuroides* Fernald; *See* Rhod. 45: 117. 1943.)

Submerged river flats (Drt.; Yrk.; R. Ouest); pond waters (Lac du Club; Tng.; Mal.; Pcé.; Newport; Nou.).

Halophyte: brackish pools in salt marshes (Bnc.; Newport).

(Boreal-)temperate eastern American: Ont. to Nfld., southw. to Ohio, La., and Fla.; Guatemala.

7. **P. amplifolius** Tuckerm. [HH]

Marly pond (Oie); lake waters (Lac Pleureuse; Lac Ste. Anne, Tbl.).

(Boreal-)temperate American: B.C. to Nfld., southw. to Calif., Kans., Tenn., and Va.

8. **P. gramineus** L. [HH]

Submerged river flats (Rim.; Drt.; R. Ouest; Mat.); ponds (Bic; Tng.; Gnd.; Cha.; Oie; Cap à l'Enfer); lake waters (Grand Lac Matane; Lac Ste. Anne, Tbl.).

Boreal circumpolar: Alaska, Yukon, Mack. (Mack. R. Delta, Great Bear L.), James Bay, s. Lab., and Nfld., southw. to Calif., Ariz., N. Mex., Nebr., Iowa, Ill., Ind., Ohio, and N.J.; s. Greenland; Iceland; Faeroes; Eurasia.

A hybrid, *P. gramineus* × *P. perfoliatus*, var. *bupleuroides*, is reported from R. Matane and R. Ouest (*See* Rhod. 45: 189. 1943).

9. **P. alpinus** Balbis, var. **tenuifolius** (Raf.) Ogden. (*P. tenuifolius* Raf.; *P. microstachys* Wolfg.; *See* Ogden, l.c., p. 90.)

Pond waters (Lac Duguay; Newport; Mat.); river edge (Ann.).

Boreal American: Aleutian Is., Alaska, Yukon, Mack., Hudson Bay, Lab., and Nfld., southw. to Calif., Colo., Mass., and Pa.; w. Greenland; e. Asia; with the species, boreal circumpolar.

9a. **P. alpinus,** var. **subellipticus** (Fernald) Ogden.

Submerged river flats (Cap Chat; Pab.; Bon.); ponds (Mar.; Cha.).

(Boreal-)temperate American: Mont. to Nfld., southw. to Idaho, Wyo., Wis., and N.Y.; with the species, boreal circumpolar.

10. **P. epihydrus** Raf. [HH]

Lake waters (Lac au Saumon); river (Rim.).

Temperate American: Wash. to Mingan Is. and Gaspe, southw. to Calif., Idaho, Ill., and W. Va.; gap in continental western America.

10a. **P. epihydrus,** var. **Nuttallii** (Cham. & Schlecht.) Fernald.

Subalpine lakes (Lac des Américans and Lac Fortin, Tbl.).

Boreal American: Alaska to s. Lab. and Nfld., southw. to Calif., Colo., Tenn., and Ga.; gap in continental western America.

11. **P. zosteriformis** Fernald. [HH] (*P. zosterifolius* of Gray's Man., ed. 7.)

Marly ponds (Lac Porc-Epic, Bic; Cha.; Oie); lake waters (Lac au Saumon).

Boreal circumpolar: central Alaska, n. Alb., Man., James Bay, and e. Que., southw. to Calif., Colo., Ill., and Va.; Eurasia.

12. **P. foliosus** Raf., var. **macellus** Fernald, Mem. Gray Herb. 3: 46. 1932. [HH]

Submerged river flats (Lou.; Mad.; Mat.); marly pond (Oie).

Boreal American: Mack. (w. of Great Bear L.), n. Alb., Lake Mistassini, e. Que., and Cape Breton I., southw. to Calif., Nev., Utah, Colo., Kans., Mo., and Fla.

13. **P. pusillus** L. [HH] (*P. panormitanus* Biv., var. *major* G. Fischer; *see* Fernald, Rhod. 50: 154. 1948.)

Submerged river flats (Ann.; Drt.; Jhn.; PCa.); lake waters (Lac au Saumon).

Halophyte: brackish pools at river mouths (Ann.; Drt.).

Temperate circumpolar: central Yukon, n. Alb., Man., e. Que., southw. to Calif., Ark., and Va.; Iceland; Eurasia.

14. **P. obtusifolius** Mertens & Koch. [HH]

Halophyte: brackish pools (Fame Point; Bon.).

(Boreal-)temperate circumpolar: Vancouver I.; gap in continental western America; Great Lakes region to se. Lab., southw. to Pa. and N.J.; Greenland; Eurasia.

15. **P. Berchtoldi** Fieber, var. **mucronatus** Fieber. [HH] (*P. pusillus*, var. *Berchtoldi* (Fieber) Hagstr.; *P. pusillus,* var. *mucronatus* (Fieber) Graebner.)

Marly ponds (Lac Porc-Epic, Bic; Ann.); subalpine ponds (Lac des Américains and Lac Fortin, Tbl.).

Halophyte: brackish pools at river mouth (Drt.).

Boreal circumpolar: Alaska, n. B.C., Great Lakes region, Côte Nord, and Nfld., southw. to Mont. and Del.; sw. Greenland; Iceland; Eurasia.

15a. **P. Berchtoldi,** var. **polyphyllus** (Morong) Fernald. (*P. pusillus*, var. *polyphyllus* Morong.)

Submerged river flats (Val.); pond (Cap à l'Enfer).

Boreal American: n. Alb. (upper delta of Athabasca R.) to e. Que., southw. to Nebr., Wis., and N.Y.

15b. **P. Berchtoldi,** var. **colpophilus** Fernald. (*P. pusillus,* var. *colpophilus* Fernald; Fernald, l.c., p. 81. 1932, key; *See* also Rhod. 42: 246. 1940.)

Submerged river flats (Drt.) (type station).

Halophyte: brackish pools at river mouth (Drt.).

Local endemic. (The basis of Gaspe citations of *P. loculosus.*)

13. JUNCAGINACEAE

(Arrow Grass Family)

a. Ovaries 3, nearly distinct, at length divergent; flowers few, bracteate, in a loose raceme upon a leafy stem.............. ....1. *Scheuchzeria*

a. Ovaries 3-6, united until maturity; leaves radical; flowers numerous, ebracteate, in a spike-like raceme terminating a jointless scape...................2. *Triglochin*

1. SCHEUCHZERIA L.

1. **S. palustris** L., var. **americana** Fernald, Rhod. 25: 178. 1923. [Hsr]

Wet ground (Gnd.; Nou.; Sayabec); alpine quagmire (Tbl.) (paratype station).

Boreal American, alpine: Alaska, Great Lakes region, Hudson Bay, Lab., and Nfld., southw. to Calif., Wis., Pa., and N.J.; the whole species, boreal circumpolar.

Differs from the European plant in its longer (7-10 mm.) follicles with a definite thick style 0·5-1 mm. long, and its larger seeds (4-5 mm. long).

2. TRIGLOCHIN L.

(Arrow Grass)

a. Fruit linear with subulate base, 3-5 times as long as thick; carpels 3, beginning to separate first at the base..1. *T. palustris*

a. Fruit oblong or ovoid, about twice as long as thick; carpels thick, not beginning to separate first at base..2. *T. maritimum*

1. **T. palustris** L. [Hrr] Marsh Arrow Grass

Swamps and wet meadows (Bic; Mont Joli; Baie des Sables; Mtn.; Ann.; Cld.; Mad.; Ros.; Yrk.; Jhn.; Gnd.; Bon.; Res.); brackish waters (Ste. Luce); clays of sea beach (Fla.). General in its habitat.

(Arctic-)boreal circumpolar: Aleutian Is., Alaska, Yukon, Mack. (Mack. R. Delta, Great Bear L.), n. Hudson Bay, n. Lab., and Nfld., southw. to N. Mex., Ind., Pa., and N.Y.; S. Am.; w. and e. Greenland; Iceland; Faeroes; Eurasia.

2. **T. maritimum** L. [Hr] Arrow Grass

Cedar swamp (Bic; Malbaie); swamp (Ann.); marly bog (Gnd.).

Halophyte: salt marshes (Bic; Pointe au Père; Val.; Ren.; Pén.; Drt.; Bon.).

(Arctic-)boreal circumpolar (maritime): Alaska, Yukon, Mack. (Mack. R. Delta, Great Bear L.), Hudson Bay (Churchill), n. Que., n. Lab., and Nfld., southw. to Lower Calif., n. Mex., Nebr., Wis., Ohio, and N.J.; S.A.; Iceland; Faeroes; Eurasia; n. Africa. One of the maritime elements in the flora of the Great Lakes.

14. ALISMACEAE

(Water Plantain Family)

a. Flowers monoecious; stamens many; carpels in a head..............1. *Sagittaria*

a. Flowers perfect; stamens 6-9; carpels in a ring..........................2. *Alisma*

1. SAGITTARIA L.

(Arrowhead)

a. Style papilliform; beak a tiny erect point from a notch at one corner of the rounded summit of the achene..1. *S. cuneata*

a. Style subulate or longer; beak subulate, sometimes triangular, from one-half to longer than the diameter of the achene, incurved usually at right angles; leaves ovate, acute, the basal lobes triangular, acute........................2. *S. latifolia*

1. **S. cuneata** Sheldon [Hel] (*S. arifolia* Nutt.)

Brackish waters at river mouth (PCa.); swampy ground (Bic; Cap Chat; Mad.; Val.; Drt.; Yrk.; Mal.; Bon.; Nou.).

Temperate American: B.C., Mack. (Great Slave L.), James Bay, e. Que., southw. to Calif., N. Mex., Kans., Ind., Ohio, Pa., and Conn.

Forma *hemicycla* Fernald, with ovate, rounded leaves (rather than linear-lanceolate to ovate, acute, or acuminate) is the plant represented in the above collections.

2. **S. latifolia** Willd. [Hel]

River waters (Rim.); marly pond (Lac Porc-Epic, Bic); swampy ground (Val.; Dan.; Bon.; Nou.).

Temperate American: B.C. to e. Que., southw. to Calif., Ariz., Tex., La., Ala., and Fla.

Forma *hastata* (Pursh) Robinson, with leaves and their basal lobes oblong-lanceolate and acute, has been collected in the alluvium of a brook at Matapedia.

Forma *gracilis* (Pursh) Robinson, with leaves and their basal lobes narrowly linear, has been collected on the marly shores of Lac à l'Oie, New Richmond.

2. Alisma L.

(Water Plaintain)

1. **A. triviale** Pursh. [Hel] (*A. Plantago-aquatica* of Gray's Man., ed. 7.)

Edge of stream (St. Donat, Rimouski co.).

Temperate American: B.C. to e. Que., southw. to Ariz., Mex., Nebr., Mich., and Md.; differs from the European *A. Plantago-aquatica* in its white flowers and shorter anthers and styles. (*See* Fernald, Rhod. 48: 86-88. 1946.)

15. GRAMINEAE

(Grass Family)

[Hitchcock: Manual of the grasses of the United States; U.S. Dept. of Agric., Misc. Publ. No. 200. 1935. Dore and Roland: The grasses of Nova Scotia; Proc. N.S. Inst. Sci. 20: 177-288. 1941-1942.]

Key to the Tribes

a. Spikelets 1-many-flowered, terete or laterally compressed, when 2-flowered the lower floret not sterile and not of a different texture from the upper floret; internodes usually present between the flowers; rhachilla generally articulated above the glumes (several exceptions).
  b. Spikelets borne in a 2-rowed spike.
    c. Spikelets on opposite sides of the rhachis; spike solitary, terminal..2. Tribe HORDEAE
    c. Spikelets on one side of the rhachis, the spikes, therefore, 1-sided..5. Tribe CHLORIDEAE
  b. Spikelets in panicles, either open or spike-like, rarely in racemes.
    c. Spikelets 2-many-flowered.
      d. Glumes shorter than the lowest floret; lemmas awnless or awned at the tip, more rarely just below the tip or between the teeth....1. Tribe FESTUCEAE
      d. Glumes usually equalling or surpassing the lowest floret; lemmas usually with a bent awn inserted on the back or between the teeth, more rarely awnless; rhachilla prolonged behind the palea of the uppermost floret..3. Tribe AVENEAE

c. Spikelets with 1 fertile flower.

d. Sterile lemmas none (the flower solitary and fertile); palea 2-nerved.

e. Palea usually smaller than the lemma and enclosed in it, usually 2-keeled; articulation of rhachilla either above or below the glumes.............................4. Tribe AGROSTIDEAE

e. Palea about equalling the lemma, 1-keeled; articulation of rhachilla below the glumes; glumes minute; spikelets much flattened laterally.............................7. Tribe ORYZEAE

d. Sterile lemmas 2 (the spikelets 3-flowered but the two lower florets sterile); palea 1(-2)-nerved.............................6. Tribe PHALARIDEAE

a. Spikelets 2-flowered, the upper floret perfect, the lower one staminate or neutral and often of a different texture; internodes between the florets usually undeveloped; rhachilla articulated below the glumes; first glume smaller than the second; lemma cartilaginous or chartaceous, firmer than the glumes............8. Tribe PANICEAE

Tribe 1. FESTUCEAE

a. Spikelets unisexual, clustered, the terminal member of each cluster pistillate and with broad glumes, the lateral members staminate and with many very narrow glumes; inflorescence a spike-like panicle; lemmas very narrow, strongly scabrous on the keel.............................1. *Cynosurus*

a. Spikelets bisexual; panicle generally open.

b. Rhachilla covered with long silky hairs, which at maturity exceed the glumes; plant tall, reed-like, 1·5-4 m. high, from long creeping rootstocks......2. *Phragmites*

b. Rhachilla naked or short-pilose; plants not reed-like.

c. Lemmas 3-nerved, 2-2·5 mm. long, erose-truncate at apex, the lateral nerves and callus glabrous; spikelets in open panicles, usually 2-flowered; lemmas and paleas both deciduous with the rhachilla internodes.......................3. *Catabrosa*

c. Lemmas 5-many-nerved, sometimes cobwebby at base.

d. Spikelets in dense 1-sided clusters on the rays of the panicle; rays naked below, contracted after flowering; lemmas 5-nerved, ciliate-keeled, short awn-pointed; plant coarse, glaucous, scabrous.............................4. *Dactylis*

d. Spikelets not in dense 1-sided clusters.

e. Lemmas keeled, often with cobwebby hairs at base..................5. *Poa*

e. Lemmas rounded on the back, with no cobwebby hairs.

f. Nerves of the lemmas prominent, raised, not converging at the apex.............................6. *Glyceria*

f. Nerves of the lemmas not prominent.

g. These nerves not converging at apex; lemmas obtuse.............................7. *Puccinellia*

g. These nerves converging at apex; lemmas acute.

h. Spikelets 5-12 mm. long; lemmas entire, often awned at apex, with no more than 5 nerves; grain glabrous, often free from the palea.............................8. *Festuca*

h. Spikelets more than 12 mm. long, rarely shorter; lemmas bifid at apex, or more than 5-nerved, usually awned just below the apex between or behind the teeth.

i. Grain pubescent at summit, adhering to the palea; stigmas inserted below a hairy cushion-like appendage at summit of ovary.............................9. *Bromus*

i. Grain not pubescent, free; stigmas terminal; lemmas with a ring of short hairs at the base; florets reddish purple.........10. *Schizachne*

Tribe 2. HORDEAE

a. Spikelets solitary at each node of the rhachis.

b. Perennials; spikes slender; spikelets 4-12-flowered, placed flatwise to the rhachis.............................11. *Agropyron*

b. Annual or winter-annual cultivated cereals; spikes denser and stouter; spikelets 3-5-flowered.............................12. *Triticum*

a. Spikelets more than 1 at each node, placed edgewise.
  b. Spikelets 2 at each joint, both alike; glumes well developed............13. *Elymus*
  b. Spikelets 3 at each joint, the later pair sometimes reduced to awns; glumes small and awn-like..14. *Hordeum*

Tribe 3. AVENEAE

a. Articulation below the glumes; glumes very unequal, one enlarged and often obtuse; florets usually awnless; spikelets 3-4 mm. long......................15. *Sphenopholis*

a. Articulation above the glumes; glumes nearly equal; florets awned.
  b. Awns from between the teeth of the bidentate apex of the lemma, flattened, twisted; florets several, not closely approximate, the uppermost equalled or exceeded by the glumes; ligule a row of fine hairs..................16. *Danthonia*
  b. Awns dorsal, not flattened.
    c. Spikelets less than 1 cm. long; grain free.
      d. Lemma keeled, bidentate, the awn arising from above the middle...17. *Trisetum*
      d. Lemma convex, awned from the middle or below; spikelets borne at the ends of capillary branches...18. *Deschampsia*
    c. Spikelets more than 1 cm. long; grain adherent to the palea............19. *Avena*

Tribe 4. AGROSTIDEAE

a. Lemma indurated, thicker and firmer than the glumes; spikelets dorsally compressed or terete.
  b. Spikelets awnless, dorsally compressed; lemma without a callus, the margins inrolled..20. *Milium*
  b. Spikelets with a deciduous terminal awn, subterete; lemma with a short obtuse callus, the margins not inrolled....................................21. *Oryzopsis*

a. Lemma hyaline or membranaceous at maturity.
  b. Lemma awned from the tip or mucronate, closely infolding the grain; callus acute.
    c. Rhachilla not prolonged behind the palea; lemma pointed or awned; glumes at least half as long as the floret................................22. *Muhlenbergia*
    c. Rhachilla prolonged into a bristle behind the palea; lemma long-awned; glumes minute or wanting..23. *Brachyelytrum*
  b. Lemma awnless or dorsally awned, loosely embracing the grain.
    c. Glumes conspicuously compressed-carinate; spikelets in dense spike-like panicles; panicle exserted, cylindrical.
      d. Lemma hyaline, awnless, glumes abruptly aristate............**24. *Phleum***
      d. Lemma hyaline, awned below the middle; palea none; glumes not aristate...25. *Alopecurus*
    c. Glumes not conspicuously compressed; spikelets in open or narrow panicles; lemmas 3-5-nerved, awned or awnless; pericarp adherent to the grain.
      d. Floret stipitate; palea 1-2-nerved; stamen 1; branches of panicle capillary, flexuous, spreading or drooping....................................26. *Cinna*
      d. Floret not stipitate; palea 2-nerved; stamens 3.
        e. Rhachilla not prolonged behind the palea; glumes longer than the floret, awnless; panicle usually open..............................27. *Agrostis*
        e. Rhachilla prolonged behind the palea, bristle-like.
          f. Panicle loose or contracted; prolonged rhachilla and callus with long hairs; lemma short-awned below the middle..................28. *Calamagrostis*
          f. Panicle dense and spike-like; prolonged rhachilla and callus with short hairs; lemmas awnless; leaves soon involute...............29. *Ammophila*

Tribe 5. CHLORIDEAE

a. Spikelets narrow; glumes narrow, unequal; rhachis prolonged beyond the top spikelet...30. *Spartina*

a. Spikelets orbicular; glumes broad, boat-shaped, inflated, equal; rhachis not prolonged...31. *Beckmannia*

Tribe 6. PHALARIDEAE

a. Sterile lemmas reduced to minute hairy scales, much shorter than the indurated shining fertile lemma, awnless; glumes equal, much longer than the fertile lemma ....32. *Phalaris*

a. Sterile lemmas not reduced, larger than the fertile lemma.
  b. Sterile lemmas staminate and awnless; glumes subequal, scarcely exceeding the florets..33. *Hierochloe*
  b. Sterile lemmas empty and dorsally awned; glumes very unequal, sparsely pilose; spikelets brownish green..34. *Anthoxanthum*

Tribe 7. ORYZEAE

One genus..35. *Leersia*

Tribe 8. PANICEAE

a. Spikelets not surrounded by bristles from below the base; inflorescence a diffuse panicle, or of several racemes.
  b. Spikelets crowded along one side of the panicle branches, almost sessile, with the glumes or sterile lemma awned and stiffly hispid..................36. *Echinochloa*
  b. Spikelets not crowded, longer pedicelled; glumes and sterile lemma not awned, often pubescent but never stiffly hispid.
    c. Spikelets in pairs in 2 rows along one side of an axis; inflorescence of several racemes, digitate at the top of the culm.............................37. *Digitaria*
    c. Spikelets in diffuse panicles, these often half the length of the entire plant, included at base until maturity; sheaths and leaves copiously papillose-hispid ....38. *Panicum*

a. Spikelets with 1 to many long bristles from below the base; inflorescence a dense spike-like panicle...39. *Setaria*

1. CYNOSURUS L.

(Dog's Tail Grass)

1. C. CRISTATUS L. [Hs]

Field near hotel (Gpe.).

European: adventive in N.A. from Ont. to Nfld., southw. to Va., and on the west coast; Faeroes.

2. PHRAGMITES Trin.

(Reed Grass)

1. **P. communis** Trin., var **Berlandieri** (Fourn.) Fernald. [Grh(-Hel)] (*P. communis* of Gray's Man., ed. 7; *P. maximus*, var. *Berlandieri* (Fourn.) Moldenke; *See* Rhod. 34: 211. 1932; Torreya 36: 93. 1936; Rhod. 43: 286. 1941.)

Swamps (Bic; Drt.; Res.).

Temperate American: B.C. to e. Que., southw. to Mex. and Fla.; with the European species, from which it differs in its longer glumes, temperate circumpolar.

3. CATABROSA BEAUV.

(Whorl Grass. Hair Grass)

1. **C. aquatica** (L.) Beauv., var. **laurentiana** Fernald, Rhod. 35: 137. 1933. [Hsr]

Halophyte: salt marshes (Bic; Cap. (type station); Ann.; Trl.; Lou.; Pcé.; Pas.; Bon.).

Boreal eastern American (maritime): e. Que. to s. Lab. and Nfld., southw. to P.E.I. and N.B.; with the species, arctic circumpolar.

4. DACTYLIS L.

(Orchard Grass)

1. D. GLOMERATA L. [Hs]

Fields and roadsides (Bic; Rim.; New Carlisle; Irn.).
European: naturalized throughout temperate N.A.

5. POA L.

(Meadow Grass. Blue Grass)

a. Spikelets little compressed, narrow, much longer than wide; lemmas convex on the back, the keels obscure, the marginal and intermediate nerves usually obscure; plants tufted.
  b. Culms slender, on the average less than 30 cm. tall; numerous short innovations at base; blades usually folded or involute......................1. *P. Sandbergii*
  b. Culms stouter, on the average more than 50 cm. tall; innovations not numerous.. ....2. *P. Canbyi*

a. Spikelets distinctly compressed; glumes and lemmas keeled.
  b. Annual; sheaths loose; leaves very soft; spikelets crowded, about 4 mm. long; lemma distinctly 5-nerved, the nerves hairy below..................3. *P. annua*
  b. Perennials.
    c. Culms from extensively creeping rootstocks, not tufted.
      d. Culms flattened, wiry, bluish green, geniculate-ascending; panicles 2-8 cm. long, the branches in pairs; spikelets not over 6 mm. long; lemmas obscurely nerved, more or less bronzed at the summit................4. *P. compressa*
      d. Culms terete, stout, glaucous, erect; blades thick; panicle heavy, 8-16 cm. long; spikelets 8-12 mm. long; lemmas distinctly nerved......5. *P. eminens*
    c. Culms tufted.
      d. Creeping rootstocks present; intermediate nerves of lemma glabrous, the marginal nerves and the keel hairy; culms bearing strongly ascending tufts of new green leaves from the basal sheaths.................6. *P. pratensis*
      d. No creeping rootstocks, but culms sometimes decumbent at base.
        e. Leaves acute, glabrous on the keel; panicle very open, the branches mostly in 2's or 3's; sheaths glabrous.
        Leaves 2-5 mm. wide; upper ligules 0·3-1·5 mm. long; primary panicles 0·6-2 dm. long; spikelets 3-5-flowered, 3·5-5·5 mm. long; lemmas 3·2-4 mm. long..7. *P. saltuensis*
        Leaves 1-3·5 mm. wide; upper ligules very short; primary panicles 3-11 cm. long; spikelets mostly 2-flowered, 3-3·8 mm. long; lemmas 2·4-3 mm. long.....................................7a. *P. saltuensis*, var. *microlepis*
        e. Lemmas pubescent at least on the keel.
          f. Culms upright from a crown or caudex.
            g. Caudex stout; leaves 3-6 mm. wide; glumes broad, abruptly acute; lemmas pilose for half their length.......................8. *P. alpina*
            g. Caudex more slender; leaves 1-5 mm. broad; glumes longer, narrowed, more hyaline; lemmas more hyaline, the pilosity of the nerves running much higher..9. *P. gaspensis*
          f. Culms forming loose tufts, often decumbent.
            g. Culms rarely over 3 dm. high, their decumbent bases forming loose tufts; leaves thin, lax, strongly nerved, 1-1·5 mm. wide; lowermost panicle branches long, usually with only 1 spikelet; lemmas pubescent but very sparsely webbed..........................10. *P. Fernaldiana*
            g. Culms taller or, if low, stiff and with scarcely decumbent bases.
              h. Lemmas not webbed at base; panicle 3-7 cm. long, the short scabrous branches erect; spikelets often purplish................11. *P. glauca*

h. Lemmas webbed at base.
  i. Marginal nerves glabrous; culms scabrous below the panicle; sheaths and blades retrorsely scabrous; ligule 4-6 mm. long; lemma strongly nerved, silky-pubescent on the keel only....12. *P. trivialis*
  i. Marginal nerves pubescent.
    Panicle erect, 0·4-1 dm. long (rarely longer), the branches ascending..13. *P. nemoralis*
    Panicle drooping, 1-3 dm. long, the branches spreading...14. *P. palustris*

1. **P. Sandbergii** Vasey. [Hs] (*See* St. John, Amer. Journ. Bot. 28: 78-81. 1941.)

Calcicole: sea cliffs (Bic; Pcé.); inland cliffs (Tra.).

Disjunct American: Alaska and Yukon to Calif., Nev., Utah, Colo., and N. Dak.; e. Que.; closely related to the Chilean *P. secunda* Presl.

2. **P. Canbyi** (Scribn.) Piper. [Hs] (*P. lucida* Vasey; *P. laevigata* Scribn.)

Calcicole: sea cliffs (Bic; Tra.).

Disjunct American: Yukon to Minn. and Mich., southw. to Ariz. and Nebr.; e. Que.

3. P. ANNUA L. [T] Annual Bluegrass

Open ground (Gpe.); sea cliffs (For.); wooded hillside (Car.).

European: naturalized in N.A. from Alaska to Lab. and Nfld., southw. to Calif. and Fla.; Iceland; Faeroes.

4. P. COMPRESSA L. [Hsr] Canada Bluegrass

Open ground (Ann.; Bon. I.); sandy flats (Ann.; Car.).

European: naturalized in N.A. from Alaska to Nfld., southw. to Calif. and Ga.

5. **P. eminens** J. S. Presl. [Grh] (*P. glumaris* Trin.)

Psammophilous halophyte: gravelly seashores (Bic; St. Luce; Mét.; Ann.; Trl.; Tng.).

Disjunct American (maritime): Aleutian Is. and Alaska to B.C.; isolated station in s. Hudson Bay; e. Que., Lab., Nfld., Magdalen Is.; e. Asia.

6. **P. pratensis** L. [Grh] Kentucky Bluegrass

Sea cliffs (Bic; Pcé.); field (Mét.); alpine and subalpine situations (Tbl.; Log.; Ftn.; Bln.). General.

Arctic circumpolar: Aleutian Is., Alaska, Yukon, Mack., Ellesmere, Baffin, n. Lab., southw. to Mexico; Greenland; Iceland; Faeroes; arctic and alpine Eurasia. Between the type form and var. *alpigena* Fries (*P. alpigena* (Fr.) Lindm.) there seem to exist all kinds of intermediate forms (*See* Raup in Sargentia 6: 111-112. 1947), so no attempt is made here to separate the two forms.

7. **P. saltuensis** Fernald & Wiegand, Rhod. 20: 122. 1918. [Hs]

Damp woods (Bic; Cap Chat); river-banks (Ann.; Gnd.); inland cliffs (Tra.); calcareous alpine meadow (Tbl.); subalpine meadow (Log.).

(Boreal-)temperate eastern American: w. Ont. to Nfld., southw. to n. Mich. and Md.; sometimes confused with the more southern *P. debilis* Torr.

7a. **P. saltuensis,** var. **microlepis** Fernald & Wiegand, Rhod. 20: 124. 1918.

Wooded river-banks (Ann.; GCa.); cedar swamp (Car.).

(Boreal-)temperate eastern American: Montmorency Falls, Gaspe Peninsula, Anticosti, Nfld.

8. **P. alpina** L. [Hs] Alpine Bluegrass

Calcicole: sea cliffs and boulders (Bic; Cap Chat; Trl.; Srl.; Lbn.; For.; Pcé.; Bon. I.); river ledges and gravels (Ann.; Gnd.; Pab.; Bon.; PCa.; Esc.; Mat.); alpine situations (Alb.; Log.; Mtt.).

Arctic circumpolar, alpine: Alaska, Yukon, Mack. (Great Bear L.), n. Baffin, Hudson Bay, n. Lab., and Nfld., southw. to the Great Lakes region and N.S., and in the mts. to Oreg., Utah, and Colo.; w. and e. Greenland; Iceland; Faeroes; Spitsbergen; arctic and alpine Eurasia.

9. **P. gaspensis** Fernald, Rhod. 31: 46. 1929. [Hs] Gaspe Bluegrass

Calcicole: river gravels (Ann.) (type station); syenitic alpine rock-slides (Tbl.); habitat not stated (Bon. I.).

Disjunct American, alpine: Alaska (*See* Fernald, Rhod. 44: 113. 1942); Gaspe Peninsula.

10. **P. Fernaldiana** Nannf., Symb. Bot. Upsal. 1: 50. 1935. [Hs] (*P. laxa* of Gray's Man., ed. 7.)

Sea ledges (Bic); woods (Cap Chat; Gpe.); alpine slopes (Tbl.; Log.; Mtt.; Ftn.; Bln.).

(Boreal-)temperate eastern American, alpine: e. Que. to Nfld., southw. in the mts. to N.Y., Vt., N.H., and Me.

Nannfeldt has shown that the *Poa laxa* of previous authors comprises three species, viz., the true *P. laxa* Haenke in the mountains of central and southern Europe, *P. flexuosa* Sm. in northern Europe, and *P. Fernaldiana* Nannf. in North America.

11. **P. glauca** Vahl. [Hs] (*P. caesia* Sm.)

Calcicole: sea cliffs (Bic; Trl.; Srl.; Prr.; Lbn.; Pcé.); river gravels (Ann.; Bon.; PCa.); cliffs above lake (Lac Pleureuse); inland cliffs (Tra.); alpine slopes (Tbl.; Log.; Pem.; Ftn.).

Arctic circumpolar, alpine: Alaska, Yukon, Coronation Gulf, Keewatin, Ellesmere, Devon, n. Baffin, Bylot I., Melville, n. Lab., and Nfld., southw. to B.C., the Great Lakes, e. Que., and in the mts. to N.H. and Vt.; Greenland; Iceland; Faeroes; Spitsbergen; arctic and alpine Eurasia.

12. P. TRIVIALIS L. [Hsr] Rough Bluegrass

Wet ground (Bic; Gpe.; Pcé.; Bon. I.).

Eurasian: naturalized in N.A. from s. Alaska to Nfld., southw. to Calif., S. Dak., La., and Va.; Iceland; Faeroes.

13. P. NEMORALIS L. [Hs] Wood Bluegrass

Sea ledges (Bic); turfy alpine slope (Ftn.); sea beaches (Ann.; St. Omer); sea cliffs (Trl.; Srl.; Pas.); inland cliffs (Tra.); river ledges (Nou.).

European: naturalized throughout boreal and temperate N.A.

14. **P. palustris** L. [Hs] (*P. triflora* Gilib.; *P. serotina* Ehrh.; *P. crocata* Michx.) Fowl Bluegrass

Sea cliffs (Bic; Lou.; Anse à Vallon; Pas.); meadows (Lac du Club; Irn.); sea coast (Mét.; Mtn.; Ann.; Ren.; Pas.); inland cliffs (Tra.); wet meadows (Gpe.; Yrk.).

Boreal circumpolar: Aleutian Is., s. Alaska, Yukon, Mack., s. Hudson Bay, Lab., and Nfld., southw. to Calif., N. Mex., Nebr., Mo., and Va.; Greenland; Eurasia; n. Africa.

6. GLYCERIA R. Br.

(Manna Grass)

a. Spikelets 10-25 mm. long, narrowly cylindrical.

b. Spikelets 20-25 mm. long, subsessile, 7-12-flowered; glumes acute, scarious and shining; lemma 6 mm. long, 7-nerved, scabrous, with a shining scarious margin and summit, shorter than the palea............................1. *G. fluitans*

b. Spikelets 10-15 mm. long, on slender pedicels, 7-13-flowered; glumes subacute; lemma 3·5-4 mm. long, strongly 7-nerved, minutely scabrous or glabrous, only the nerves hispidulous, slightly exceeding the palea...............2. *G. borealis*

a. Spikelets 2-7 mm. long, ovate or oblong.

b. Panicle contracted, linear, 1·5-3 dm. long; spikelets 1·5-2 mm. wide, 3-4-flowered; lemma 7-nerved..3. *G. melicaria*

b. Panicle open, lax.

c. Spikelets 3-4 mm. wide; lemmas obscurely nerved; panicle very loose and open, the remote capillary branches drooping, naked below; spikelets 5-10-flowered, ovate, tumid, 5-7 mm. long...............................4. *G. canadensis*

c. Spikelets 2·5 mm. wide or less; lemmas strongly nerved.

d. Spikelets 2-3 mm. long, purple; upper glume 1 mm. long: lemmas rounded, with broad scarious tip; panicle 7-20 cm. long........5. *G. striata*, var. *stricta*

d. Spikelets 4-7 mm. long; upper glume 2-2·5 mm. long.

e. Panicle 15-40 cm. long, diffuse; spikelets 4-7-flowered, 5-6 mm. long, with purple florets and whitish glumes; leaves 6-15 mm. wide; sheaths loose; culms 1-2 m. high, stout, erect............................6. *G. grandis*

e. Panicle 5-7 cm. long, pale, the fascicled branches lax, flexous; spiklets 3-5-flowered, 4-5 mm. long; larger leaves 2-3 mm. wide; sheaths close; culms very slender, 2-4 dm. high, usually geniculate and spreading..7. *G. Fernaldii*

1. **G. fluitans** (L.) R. Br. [Hel]

Wet sandy soil (Pcé.).

(Boreal-)temperate circumpolar: S. Dak.; Que. to Nfld., southw. to N.Y.; Iceland; Faeroes; Eurasia.

2. **G. borealis** (Nash) Batch. [Hs]

Wet places (Bic; Rim.; Ann.; Drt.; Gpe.; Yrk.; Pcé.; Gnd.; Cha.; Bon.; PCa.; GCa.; Mar.).

Boreal American: Alaska and Yukon to s. Lab. and Nfld., southw. to Oreg., Colo., and N.Y., and in the mts. to Calif. and N. Mex.

3. **G. melicaria** (Michx.) Hubb. [Hs]

Wet places (Bic; Rim.).

Temperate eastern American: Minn. to e. Que., southw. to Ky. and Pa., and in the mts. to N.C.

4. **G. canadensis** (Michx.) Trin. [Hs] Rattlesnake Grass

Wet places (Bic; Rim.; Yrk.; Dou.; Mal.; Cha.; Mar.); edge of subalpine lakes (Lac Ste. Anne, Tbl.; Lac au Diable, Alb.).

(Boreal-)temperate eastern American: Minn. to Côte Nord and Nfld., southw. to Ill., Va., and Md.

5. **G. striata** (Lam.) Hitchc., var. **stricta** (Scribn.) Fernald. [Hs] (*G. nervata*, var. *stricta* Scribn.)

Wet woods (Bic); wet places (Bic; St. Omer; Bon. I.; Gnd.; New Richmond; Mar.); river gravels (Ann.; Prr.; Mat.); edge of subalpine lake (Lac Ste. Anne, Tbl.). General.

Boreal American: Alaska, Yukon, Mack. (Great Slave L.), Hudson Bay (Churchill), s. Lab., and Nfld., southw. to the northernmost states, and in the Rocky Mts. to Ariz. and N. Mex.; Mexico.

6. **G. grandis** Wats. [Hs] Reed Meadow Grass.

Swampy ground and ditches (Bic; Rim.; R. Blanche; Cap Chat; Trl.; Drt.; Yrk.; Mal.; Pcé.; Bon.; PCa.; GCa.; Mar.).

Boreal American: Alaska, Yukon, Mack. (Great Slave L.), middle Hudson Bay, James Bay, e. Que., southw. to Oreg., Nev., N. Mex., Nebr., Iowa, Tenn., and Va.

7. **G. Fernaldii** (Hitchc.) St. John. [Hs] (*G. pallida* (Torr.) Trin., var. *Fernaldii* Hitchc., Rhod. 8: 211. 1906; *See* St. John, Rhod. 19: 75-76. 1917; Kelso, Rhod. 35: 225-226. 1933; Chase, Amer. Journ. Bot. 24: 33-35. 1937; Fassett, Bull. Torrey Bot. Club 73: 463-464. 1946.)

Dried bog (Bic).

(Boreal-)temperate eastern American: Minn. to Côte Nord and Nfld., southw. to Conn.; somewhat more northern than *G. pallida*.

7. Puccinellia Parl.

(Goose Grass)

- a. Anthers 1·5-2·2 mm. long; panicles 8-12 cm. long; spikelets 4-10-flowered, 6-12 mm. long .... 1. *P. maritima*
- a. Anthers 0·5-1 mm. long.
  - b. Grain 1·4-1·7 mm. long.
    - c. Lemmas erose-ciliolate or serrulate under a lens.
      - d. Panicle-branches smooth or nearly so; lemmas 2·3-2·8 mm. long, firm in texture.......... 2. *P. laurentiana*
      - d. Panicle-branches strongly scabrous; lemmas thin, 2·5-3 mm. long; grain 1·4-1·6 mm. long .... 3. *P. macra*
    - c. Lemmas essentially entire .... 4. *P. paupercula*
  - b. Grain 1·8-2·5 mm. long.
    - c. Glumes and lemmas serrulate and erose ciliolate under a lens.
      - d. Plant grey-green; panicle-branches ascending or spreading, not reflexed, smooth or nearly so; lemmas firm, 2·3-2·8 mm. long....... 2. *P. laurentiana*
      - d. Plant grey-green; panicle-branches ascending or spreading, not reflexed, thin and lustrous, 3-4 mm. long..........5. *P. lucida*
    - c. Lemmas essentially entire, not ciliolate.
      - d. Lemmas 2-2·5 mm. long; panicle 1·6 cm. long..............4. *P. paupercula*
      - d. Lemmas 3-4 mm. long; panicle 3-18 cm. long .. 4a. *P. paupercula, var. alaskana*

1. **P. maritima** (Huds.) Parl. [Hs]

Psammophilous halophyte: gravels of spit (Pas.).

Amphi-Atlantic (maritime): Wash.; e. Que. and N.S. to Pa. and R.I.; s. Greenland; Iceland; w. Europe.

2. **P. laurentiana** Fernald & Weatherby, Rhod. 18: 14. 1916. [Hs]

Psammophilous halophyte: gravelly beach (Bic; Car.).

E. Que. endemic (maritime).

3. **P. macra** Fernald & Weatherby, Rhod. 18: 15. 1916. [Hs]

Psammophilous halophyte: sandy and gravelly beaches (Pén.; Bon. I. (type station); Car.).

Gaspe endemic (maritime): eastern representative of the Pacific *P. nutkaensis* (Presl) Fernald & Weatherby.

4. **P. paupercula** (Holm) Fernald & Weatherby, *See* Rhod. 18: 18. 1916. [Hs]

Calcicole: slaty sea ledges (Bic).

Halophyte: salt marsh at river mouth (Mtn.).

Arctic American (maritime): Aleutian Is., n. Alaska, Hudson Bay, Devon, Baffin, n. Lab., southw. to Oreg. and Conn.; s. Greenland; e. Asia.

4a. **P. paupercula,** var. **alaskana** (Scribn. & Merrill) Fern. & Weath. (*P. pumila* (Vasey) Hitchc.)

Halophyte: salt marshes (Bic; Mét.; Ann.; Lou.; Anse au Griffon; Ros.; Drt.; Pcé.).

Arctic American (maritime): Aleutian Is. and w. Alaska to Calif.; n. Hudson Bay (Chesterfield Inlet), Devon, Baffin, n. Que., n. Lab., and Nfld., southw. to N.H., Conn., and R.I.

5. **P. lucida** Fern. & Weath., Rhod. 18: 16. 1916. [Hs]

Sandy beach (Rim.).

Disjunct American (maritime): B.C. to Calif. and Wyo.; Gaspe Peninsula.

8. FESTUCA L.

(Fescue Grass)

[Fernald: Festuca rubra L; Rhod. 35: 132-133. 1935. Fernald: The allies of Festuca ovina in eastern America; Rhod. 37: 250-252. 1935.]

a. Culms stout, 3-10 dm. high, scabrous below the panicle, the base clothed with dry leafless sheaths; leaves scabrous; spikelets 3-4-flowered, 8-10 mm. long, often purple-tingled; glumes broad, thin, scarious, unequal, smooth, with broad hyaline margins, the first 1-nerved, the second 3-nerved, longer; lemma scabrous, 6-8 mm. long, acute; Mt. Albert serpentine plateau........................... 1. *F. scabrella*

a. Culms slender; glumes membranous, firm, the first 1-nerved, the second 3-nerved; lemma 3-6 mm. long.

  b. Basal sheaths rufous, membranous, coarsely ribbed and quickly disintegrating into loose fibers; anthers 2·5-4·5 mm. long, one-half to three-quarters the length of the palea; plants not densely cæspitose, often substoloniferous.

    c. Viviparous, the floral organs abnormally elongated; inflorescence a simple flexuous raceme of 3-8 spikelets................................2. *F. prolifera*

    c. Non-viviparous; inflorescence a panicle, at least the lower branches forking, bearing 9-70 firm spikelets.

d. Foliage comparatively soft, not strongly whitened.

e. Lemmas glabrous.

f. Basal offshoots all or in great part divergent or decumbent, forming loose mats.

g. Lemmas distinctly awned................................3. *F. rubra*

g. Lemmas awnless or merely mucronate........3a. *F. rubra,* var. *mutica*

f. Basal offshoots all erect, intravaginal; culms 2·5-9 dm. high..3b. *F. rubra,* var. *commutata*

e. Lemmas densely villous to lanate; panicle narrow and spiciform or with short branches................................3c. *F. rubra,* var. *arenaria*

d. Foliage stiff, somewhat wiry, strongly whitened......3d. *F. rubra,* var. *juncea*

b. Basal sheaths mostly whitish or drab, chartaceous, scarcely ribbed, persistent, not soon disintegrating into fibers; new basal offshoots strongly ascending from within the sheaths; anthers ¼-½ the length of the palea; plants usually densely cæspitose.

c. Awn 1·3-3 mm. long.

d. Panicle loosely open, with divergent short branches during anthesis, oblong to ellipsoid; lemmas coriaceous, strongly involute; anthers 2·5-3 mm. long...4. *F. ovina,* var. *duriuscula*

d. Panicle linear-cylindric to loosely lanceolate, 2-10 cm. long; lemmas greenish, coriaceous, strongly involute; anthers 1·2-1·7 mm. long......5. *F. saximontana*

d. Panicle spiciform, at least above, cylindric to lance-ovoid, usually 1-3 cm. long; lemmas purplish or bronze, membranaceous, scarcely involute; anthers 0·5-1 mm. long..6. *F. brachyphylla*

c. Awnless or with awns at most 0·6 mm. long; florets modified into leafy proliferous shoots; stamens wanting...............................7. *F. vivipara*

1. **F. scabrella** Torr. [Hs] (Sometimes confused with the Asiatic and Alaskan *F. altaica* Trin.) Rydberg, p. 87; Flore Laurentienne, p. 773.

Alpine serpentine barrens (Alb.); gravel outwash plain below Mt. Albert (R. du Diable); dry alpine tableland (Mtt.); subalpine meadows (Tbl.).

Disjunct American, alpine: B.C. and Alb., southw. to Oreg., N. Dak., and Colo.; Great Lakes region; serpentine hills of s. and e. Que.; limestone barrens of w. Nfld.; with *F. altaica,* of which it is treated as a subspecies by Hultén (Fl. Alaska and Yukon, p. 241), Disjunct American-Eastern Asiatic.

2. **F. prolifera** (Piper) Fernald. [Hsr] (*F. rubra,* var. *prolifera* Piper; *See* Rhod. 35: 133. 1933.)

Calcicole: river gravels (Ann.); wet calcareous alpine cliffs and ledges (Tbl.; Log.; Mtt.; Pem.; Col.; Ftn.; Bln.).

(Boreal-)temperate eastern American, alpine: e. Que., Anticosti, and Nfld., southw. in the mts. to Me. and N.H.

3. **F. rubra** L. [Hsr] Red Fescue

Calcicole: sea cliffs (Bic; Mrn.; Mad.; Clr.; Lbn.; For.; Pcé.; Cap d'Espoir; Newport; Car.); river gravels (Yrk.; Gnd.; Bon.); woods (Cap Chat; Prr.); gravel banks (Car.; Nou.).

Halophyte: brackish marshes (Gpe.; Bnc.; Bon.).

Psammophilous halophyte: sea beaches (Bic; Pén.; Anse à l'Ours; New Carlisle; St. Omer).

Boreal circumpolar: Aleutian Is., Alaska, and Mack. to Lab. and Nfld., southw. to Calif., Colo., n. Sask., James Bay, and Ga.; w. and e. Greenland; Iceland; Faeroes; Spitsbergen; Eurasia.

Forma *glaucescens* (Hartm.) Holmb., with whitish foliage, has been collected from the gravel spit at Paspébiac.

Forma *megastachys* (Gaud.) Holmb., with spikelets 1-1·7 cm. long, 6-10-flowered, and longer glumes and lemmas, has been collected at several localities (Bic; Rim.; Gpe.; Bnc.; Pcé.; Gnd.; Pas.; Bon.; Car.; Nou.).

3a. **F. rubra,** var. **mutica** Hartm.

Sea cliffs (Trl.; Pcé.); clay bank (Mtn.).

Aleutian Is.; n. and e. Que. to Nfld.; Greenland.

3b. **F. rubra,** var. **commutata** Gaud.

Sea ridges (Bic); slaty soil in swamp (Rim.); clay bank (New Richmond); river banks (Gnd.; Bon.; Nou.); sand (Pén.).

Range of the species?

3c. **F. rubra,** var. **arenaria** (Osbeck) Fries.

Sea cliffs (Trl.; Cap.; Prr.; Plr.); wet meadows (Pcé.); gravelly bank (Nou.).

Arctic circumpolar: Herschel I., Victoria I., Coronation Gulf, n. Lab., Nfld., and Gaspe; Greenland; Spitsbergen; arctic Eurasia.

3d. **F. rubra,** var. **juncea** (Hackel) Richter.

Sea cliffs (Pcé.; Pas.); sand (Pén.); gravelly beach (Car.).

Range of the species?

4. F. OVINA L., var. DURIUSCULA (L.) Koch. [Hs]

Shores of St. Lawrence (R. Blanche).

Eurasian: introduced in eastern N.A. from Minn. to Nfld., southw. to Pa.

5. **F. saximontana** Rydb., *See* Fernald, Rhod. 37: 250. 1935. [Hs]

Calcicole: sea cliffs (Bic; Trl.; For.); dry alpine schists (Pem.).

Boreal American: Alaska, Yukon, and Mack. to Mich. and Nfld., southw. to Calif., Utah, Colo., Nebr., and the mts. of Vt.

6. **F. brachyphylla** Schultes. [Hs] (*F. brevifolia* R. Br.; *F. ovina,* var. *brevifolia* (R. Br.) Hack.; *See* Fernald, Rhod. 37: 250-251. 1935.)

Sea cliffs (Bic); alpine cliffs (Tbl.; Log.; Ftn.; Bln.).

Arctic circumpolar, alpine: Aleutian Is., Alaska, Yukon, Mack. (Mack. R. Delta, Coronation Gulf), Banks I., Melville I., Victoria I., Somerset I., King William I., Ellesmere, Devon, n. Baffin, Melville, n. Lab., and Nfld., southw. to the Great Lakes region, and in the mts. to Calif., Nev., Utah, and N. Eng.; w. and e. Greenland; arctic and alpine Eurasia.

7. **F. vivipara** (L.) Sm. [Hs] (*F. ovina,* var. *vivipara* L.; *See* Fernald, Rhod. 37: 250-251. 1935.)

Calcicole: calcareous alpine cliffs (Tbl.).

(Arctic-)boreal circumpolar, alpine: Alaska (Seward Pen.); n. Que. and n. Lab., southw. in the mts. of Gaspe; Greenland; Faeroes; arctic and alpine Eurasia.

9. BROMUS L.

(Brome Grass)

a. Inflorescence not drooping, 4-11-rayed; spikelets 25-35 mm. long; lemma 10-12 mm. long, thin, awnless or with a very short awn........................ 1. *B. inermis*

a. Inflorescence more or less drooping, 2-5 rayed; spikelets 15-25 mm. long; lemma awned.

  b. Sheaths longer than the internodes, much overlapping, densely and softly short-pilose, closed, strongly ribbed, with chartaceous and auricled flanges; lemma pilose .... 2. *B. latiglumis*

  b. Sheaths much shorter than the internodes, flangeless, with a V-shaped orifice; lemmas densely villous along the margins but glabrous up the middle of the back.

    c. Spikelets generally purplish or bronze-tinged; glumes flattish or merely dorsally rounded, the second with coarse, coloured nerves; lemmas flattish, strongly nerved, conspicuously villous-hirsute especially below the middle; palea with the membranous margins showing well beyond the nerves at least for more than half its length.. 3. *B. Dudleyi*

    c. Spikelets generally greenish; glumes keeled, strongly conduplicate, the second with very slender greenish nerves, the marginal band appressed-pilose to silky; palea with the nerves appearing marginal due to infolding of the membranous edges.

      d. Middle and upper sheaths glabrous or nearly so; margins of lemma pilose to silky...4. *B. ciliatus*

      d. Middle and upper sheaths strongly villous to retrorse-pilose; margins of lemma silky.. 4a. *B. ciliatus*, var. *intonsus*

1. B. INERMIS Leyss. [Hsr] Smooth Brome

Dry sandy ground (Rim.); river shores (Drt.; GCa.).

Eurasian: widely cultivated for hay and escaped in temperate N.A.

2. **B. latiglumis** (Scribn.) Hitchc. [Hs]

Islands at river mouth (Mat.).

Temperate American: e. Mont. to e. Que., southw. to N. Mex., Tex., Iowa, Md., and N.C.

Forma *incanus* (Shear) Wiegand, with pilose sheaths, is the type represented in the above collection.

3. **B. Dudleyi** Fernald, Rhod. 32: 63. 1930. [Hs]

Calcicole: river gravels (Cap Chat; Ann.; Jhn.; Bon.; PCa.; Mat.).

(Boreal-)temperate American: Yukon, Mack., Sask., Minn., Mich., e. Que., and Nfld., southw. to Mont. and W. Va.

4. **B. ciliatus** L. [Hs] *See* Fernald, Rhod. 32: 63-71. 1930. Fringed Brome

Sea cliffs (Bic; Prr.; Lbn.); river gravels (Cap Chat; Ann.; Drt.; Yrk.; PCa.; Res.); fields and roadsides (Mét.; Val.; Yrk.; Esc.; Irn.); subalpine woods (Tbl.; Pem.).

Boreal American: Alaska, Mack., and s. Hudson Bay to s. Lab. and Nfld., southw. to s. Calif., N. Mex., N. Dak., Wis., n. Ohio, and Mass.; mts. of N.C.

4a. **B. ciliatus, var. intonsus** Fernald, Rhod. 32: 70. 1930.

Open places (R. Escuminac).

(Boreal-)temperate eastern American: Ont. to Nfld., southw. to Mich. and Pa.

10. SCHIZACHNE Hack.

(Purple Oats)

1. S. **purpurascens** (Torr.) Swallen. [Hs] (*Bromelica striata* Farwell; *Melica striata* (Michx.) Hitchc.)

Open woodlands and fields (Bic; Ann.; Prr.; Ren.; Gnd.; Irn.); calcareous inland cliffs (Tra.); alpine serpentine barrens (Alb.); gravel outwash plain below Mt. Albert (R. du Diable); alpine situations (Tbl.; Log.).

Boreal circumpolar: s. Alaska, Yukon, Mack. (Great Bear L.), James Bay, Mingan Is., and Nfld., southw. to Colo., N. Mex., Wis., Ind., Pa., and N.Y.; Eurasia.

Forma *albicans* Fernald, glumes whitish to pale straw colour and lemmas yellow to tawny, has been collected from the sea cliffs at Bic, and mossy alpine tableland of Mt. Albert, the type station.

11. AGROPYRON Gaertn.

(Couch Grass)

Fernald: Agropyron, section Goularda in eastern North America; Rhod. 35: 161-185. 1933.

a. Culms tufted, without creeping rootstocks or stolons; spikelets not strongly flattened, the individual florets promptly disarticulating at maturity, leaving the persistent glumes; inner face of fruit flattish or broadly concaved; anthers at most one-third as long as the lemma.

  b. Awns wanting or very short, at most one-half as long as the body of the lemma.

    c. Glumes coriaceous or subcoriaceous, with hyaline margins 0·4-0·6 mm. broad; spikelets scarcely imbricated, the tips rarely reaching the bases of those above on the same side; internodes of rhachis often strongly quadrate, with all 4 sides concave and winged................................1. *A trachycaulum*

    c. Glumes herbaceous to subcoriaceous, the hyaline margins only 0·1-0·4 mm. broad; all or all but the lowest spikelets well imbricated; internodes of rhachis shorter, mostly convex or merely corrugated on the back and with 2 narrow edges.

      d. Glumes 10-16 mm. long; contracted fruiting spike 5-12 mm. thick..1a. *A. trachycaulum* var. *majus*

      d. Glumes 7-10 mm. long; contracted fruiting spike 3-6 mm. thick...1b. *A. trachycaulum* var. *novae-angliae*

  b. Awns nearly equalling to much longer than body of lemma.

    c. Glumes 6-12 mm. long; awns of lemmas 7-20 mm. long...1c. *A. trachycaulum,* var. *glaucum*

    c. Glumes 12-18 mm. long; awns of lemmas 10-40 mm. long...1d. *A. trachycaulum,* var. *unilaterale*

a. Culms from creeping rootstocks; spikelets strongly flattened at maturity, dropping intact from the rhachis; inner face of fruit deeply channeled; anthers at least one-half as long as the lemma.

  b. Glumes oblong, rounded, or rather abruptly narrowed at apex, with broad scarious margins...2. *A. repens*

  b. Glumes lanceolate, gradually tapering from near the middle to the apex, the margin narrow or inrolled.........................2a. *A. repens,* var. *subulatum*

1. **A. trachycaulum** (Link) Steud. [Hs] (*A. tenerum* Vasey; *A. caninum,* var. *tenerum* Pease and Moore; *A. pauciflorum* (Schwein.) Hitchc. (*See* Rhod. 36: 417. 1934); *A. trachycaulum,* var. *typicum.*)

Calcicole: sea cliffs and ledges (Bic; Cld.; Prr.; Pcé.).

Psammophilous halophyte: gravel beach (Mtn.; Ren.; Car.; Pas.).

Boreal American: Alaska, Yukon, Mack. (Mack R. Delta, Great Bear L.), Sask., Man., Ont., Que., Nfld., southw. to Calif., Colo., Mo., and in the mts. of W. Va.; Mex.

1a. **A. trachycaulum,** var. **majus** (Vasey) Fernald, *See* Rhod. 35: 169. 1933.

Calcicole: sea cliffs (Lbn.; Pcé); alluvial islands at river mouth (Bon.); calcareous alpine meadow (Tbl.); alpine meadows and boggy spots (Alb.; Tbl.; Log.).

Crevices and talus of serpentine (Lac au Diable, Alb.).

Boreal American: B.C. to s. Lab. and Nfld., southw. to Colo., Nebr., Ont. (Lake Superior), N.H., and Me.

1b. **A. trachycaulum,** var. **novae-angliae** (Scribn.) Fernald, *See* Rhod. 35: 169. 1933.

Calcicole: inland cliffs (Tra.); river gravels (Ann.; Bon.; PCa.); seashore (St. Simon); alpine schists (Alb.; Ftn.).

Crevices and talus of serpentine (Alb.).

(Arctic-)boreal American: Mack. to n. Lab. and Nfld., southw. to Nev., Colo., Nebr., Wis., Mich., and s. N.Y.

1c. **A. trachycaulum,** var. **glaucum** (Pease & Moore) Malte, *See* Rhod. 35: 169. 1933.

Calcicole: river gravels and ledges (Bic; Ann.; Mad.; Drt.; Jhn.; Bon.; Mat.).

(Boreal-)temperate American: B.C. to Nfld., southw. to Calif., Nev., Colo., Nebr., Minn., Wis., Pa., and s. N. Eng.

1d. **A. trachycaulum,** var. **unilaterale** (Cassidy) Malte, *See* Rhod. 35: 169. 1933.

River estuary (Ann.); alluvial islands at river mouth (Bon.).

Boreal American: Yukon and Mack. to e. Que. and Anticosti I., southw. to Oreg., Nev., Colo., S. Dak., Iowa, Wis., and N.Y.

2. A. REPENS (L.) Beauv. [Grh] Couch Grass

Fields (Bic; Mét.; Baie des Sables; Pcé.; Pas.). General.

Eurasian: naturalized in N.A. from Alaska to Nfld., southw. to Calif., Iowa, Minn., and s. N. Eng.

Forma *aristatum* (Schum.) Holmb., with rhachis glabrous except for ciliate edges, glumes or especially the lemmas definitely awned, has been collected in our area (Pcé.; Pas.).

Forma *trichorrhachis* Rohlena, with rhachis pilose or hirsute, glumes and lemmas blunt, acute or merely subulate-tipped, has been collected at several localities (Bic; R. Blanche; Drt.; Gpe.; Yrk.; Bon.).

Forma *pilosum* (Scribn.) Fernald, with rhachis pilose or hirsute, glumes and lemmas definitely awned, has been collected at several localities (Drt.; Yrk.; Bon.).

2a. A. REPENS, var. SUBULATUM (Schreb.) Reich., *See* Fernald, Rhod. 35: 183. 1933.

Eurasian: represented in our area by the following forms:

Forma *Vaillantianum* (Wulf. & Schreb.) Fernald, with rhachis glabrous except for ciliate edges, glumes and especially the lemmas definitely awned, has been collected on alpine schists of Mt. Blanc.

Forma *heberhachis* Fernald, with rhachis pilose or hirsute, glumes and lemmas blunt, acute or merely subulate-tipped, has been collected at Bic, Dartmouth, and Gaspe.

Forma *setiferum* Fernald, with rhachis pilose or hirsute, glumes and lemmas definitely awned, has been collected from the gravel beach at Paspébiac.

12. TRITICUM L.

(Wheat)

1. T. AESTIVUM L. [T]
Railway ballast (Mat.).
Eurasian: cultivated throughout temperate N.A.

13. ELYMUS L.

(Dune Grass. Wild Rye)

a. Lemma acute but awnless (*See* also No. 4a); leaves firm, setaceous-involute towards the end; plants stout, reed-like, from tough extensively creeping rhizomes, maritime..1. *E. arenarius,* var. *villosus*

a. Lemma long-awned; plants not maritime.
  b. Awn recurved when dried; palea usually 9-15 mm. long.
    c. Leaves 10-18, rather thin, 13-20 mm. wide; glumes 15-20 mm. long, narrow..2. *E. Wiegandii*
    c. Leaves 4-9, rather firm, 5-15 mm. wide, usually involute when dried; glumes 20-25 mm. long, 0·5-2 mm. wide, flatter......................3. *E. canadensis*
  b. Awn short and erect (absent in 4a); palea usually 6-9 mm. long; leaves 9-12 mm. wide; spike rigidly upright, often included at the base in the upper sheath.
    c. Glumes and lemmas awned; glumes glabrous..................4. *E. virginicus*
    c. Glumes and lemmas awnless or merely subulate-tipped; glumes scabrous...4a. *E. virginicus,* var. *submuticus*

1. **E. arenarius** L., var. **villosus** E. Mey. [Grh] (subsp. *mollis* (Trin.) Hultén, Fl. Alaska and Yukon 2: 268-271. 1942; *See* St. John, Rhod. 17: 98-103. 1915.) American Dune-grass.

Psammophilous halophyte: sandy and gravelly beaches (Bic; Pte. au Père; Mét.; Lou.; Ren.; Dou.; Mal.). General in its habitat.

Arctic American (maritime): Aleutian Is., n. coast of Alaska, Coronation Gulf, Victoria I., Somerset I., Keewatin, Melville, Bylot I., n. Baffin, Lab., and Nfld., southw. to Calif. and Mass.; w. and e. Greenland; e. Asia; with the typical European form, from which it differs in its soft-pubescent culm and glumes, arctic circumpolar; one of the maritime elements in the flora of the Great Lakes.

2. **E. Wiegandii** Fernald, Rhod. 35: 192. 1933. [Hs]
Alluvial soil and river banks (Rim.; Bon.; GCa.; Mat.).
Temperate eastern American: s. and e. Que., southw. to Pa. and N.Y.

3. **E. canadensis** L. [Hs]
Alluvial thickets and woods (Drt.; Bon.; Mat.).
Boreal American: s. Alaska and Mack. to e. Que., southw. to n. Calif., Tex., Mo., Ky., and N.C.

4. **E. virginicus** L. [Hs] (*See* Fernald, Rhod. 35: 197-198. 1933.)
Alluvial shores (Ann.; Drt.).
(Boreal-)temperate American: Alb. to Nfld., southw. to Ariz. and Fla.

4a. **E. virginicus,** var. **submuticus** Hook.

Alluvial thickets and woods near river mouth (Drt.).

Temperate American: Wash. to e. Que., southw. to Mont., Okla., Ky., and R.I.

14. HORDEUM L.

a. Awns 3-7 cm. long, narrow and flexuous; body of lemma less than 8 mm. long; rhachis disarticulating readily at maturity; lateral pair of spikelets stalked, sterile, reduced to 1-3 spreading awns; leaves 2-4 mm. wide................1. *H. jubatum*

a. Awns 10-15 cm. long, rigid; body of lemma about 10 mm. long; rhachis not breaking up at the joints; lateral pair of spikelets sessile, all the spikelets perfect; leaves 6-20 mm. wide..2. *H. vulgare*

1. **H. jubatum** L. [Hs] Squirrel-tail Grass

Ballast-filling about fish-houses (Yrk.); slaty ledges (Clr.); roadside (Lou.; Bon. I.).

Halophyte: salt marshes (Bic; Gpe.).

Psammophilous halophyte: sea beach (Bic; Srl.; Pas.; Car.).

(Arctic-)boreal American: Alaska, Yukon, Bathurst Inlet, Coronation Gulf, Hudson Bay (Churchill), Lab., and Nfld., southw. to Mex. and Md.; e. Asia; introduced into Europe; one of the maritime elements in the flora of the Great Lakes.

2. H. VULGARE L. [T] Barley

Calcicole (*See* Soil Sci. 6: 250-277. 1918): gravelly beach at river mouth (Mat.).

Eurasian: introduced throughout temperate N.A.; sometimes escaped from cultivation.

15. SPHENOPHOLIS Scribn.

(Wedge Grass)

1. **S. intermedia** Rydberg. [Hs] (*S. pallens* of Gray's Man., ed. 7.)

Sea cliffs (Lbn.); cedar swamp (Car.); damp places (Bic; Ann.; Jhn.; Pcé.; Bon.; PCa.; Mat.).

(Boreal-)temperate American: Alaska (Tanana Hot Springs) and B.C. to Nfld., southw. to Ariz. and Fla.; true *S. pallens* is an awned form of S.C. and Va.

16. DANTHONIA D.C.

(Wild Oat Grass)

a. Lemma 4-5 mm. long, sparsely clothed with stiff hairs, the teeth triangular, about 0·5 mm. long; awn longer than the lemma; glumes 10-12 mm. long; spikelets 10-12 mm. long; basal leaves often curled....................1. *D. spicata,* var. *pinetorum*

a. Lemma 7-8 mm. long, glabrous except at the margins below the middle and at the base, the teeth aristate, about 2 mm. long, the awn equalling the lemma; glumes purplish, with pale scarious margins, about 15 mm. long; spikelets 15 mm. long ....2. *D. intermedia*

1. **D. spicata** (L.) Beauv., var. **pinetorum** Piper. [Hs] (*D. spicata* of Gray's Man., ed. 7; *See* Rhod. 45: 242. 1943.)

Dry rocky soil (Bic); slaty ledges (Bic; Pcé.); river gravels (Ann.); alpine meadow (Tbl.); alpine serpentine barrens (Alb.); gravel outwash plain below Mt. Albert (R. du Diable). General.

(Boreal-)temperate American: B.C. to Mingan Is. and Nfld., southw. to Oreg., N. Mex., S. Dak., Wis., Mich., Ont., and n. N.E.; more northern than the typical form.

2. **D. intermedia** Vasey. [Hs]

Calcicole: calcareous alpine meadow (Tbl.).

Alpine serpentine barrens (Alb.); gravel outwash plain below Mt. Albert (R. du Diable).

Disjunct American, alpine: Alaska, Yukon, Man., southw. to Calif. and N. Mex.; Great Lakes region; Gaspe Peninsula to Lab. and Nfld.; e. Asia (Kamtchatka).

17. TRISETUM Pers.

(False Oats)

a. Awn included within the glumes or wanting; panicle somewhat open, nodding, 10-12 cm. long.

b. Lemma bluntly 2-toothed at the apex; awn 1-2 mm. long, straight, erect; sheaths and blades roughish..1. *T. melicoides*

b. Lemma entire at the apex, awnless; lower sheaths pubescent; upper surface of the leaves pilose....................................1a. *T. melicoides*, var. *majus*

a. Awn exserted, bent.

b. Panicle dense, spike-like, 3-12 cm. long, often interrupted below; awn 4-5 mm. long, flexuous at the base.

c. Glumes pilose, subaristate; lemma obviously 2-cleft at the apex into setiform segments; leaves more or less pilose............2. *T. spicatum*, var. *pilosiglume*

c. Glumes glabrous except for the ciliolate keel, aristate.

d. Culms 1·5-3·5 dm. tall; spike 2-6·5 cm. long; leaves coriaceous, strongly nerved ....2a. *T. spicatum*, var. *Maidenii*

d. Culms 2-8 dm. high; spike 2·5-11 cm. long, much interrupted; leaves softer, densely pubescent............................2b. *T. spicatum*, var. *molle*

b. Panicle loose and open to contracted but not spike-like; awns long and strongly twisted...3. *T. flavescens*

1. **T. melicoides** (Michx.) Vasey. [Hs]

Calcicole: sea cliffs (Trl.; Pcé.; Bon. I.); river ledges and gravels (Rim.; Ann.; Mad.; Drt.; Jhn.; Bon.; PCa.; GCa.; Mat.); alpine slopes (Alb.; Tbl.).

(Boreal-)temperate eastern American: Great Lakes region to Nfld., southw. to Vt.

1a. **T. melicoides, var. majus** (Gray) Hitchc.

Calcicole: river ledges and gravels (PCa.; Mat.).

Range essentially that of the species.

2. **T. spicatum** (L.) Richter, var. **pilosiglume** Fernald, Rhod. 18: 195-198. 1916. [Hs]

Calcicole: sea cliffs (Bic; Gro.; Srl.; Prr.; Plr.; Lbn.; Pcé.); cliffs above lake (Lac Pleureuse); river ledges (Gnd.; PCa.); alpine cliffs (Alb.; Tbl.; Log.; Bln.; McNab).

(Arctic-)boreal eastern American, alpine: Great Lakes region to n. Lab. and Nfld., southw. in the mts. to Me. and N.H.; the whole species arctic circumpolar.

2a. **T. spicatum,** var. **Maidenii** (Gand.) Fernald. (*T. Maidenii* Gandoger; *See* Bull. Soc. Bot. Fr. 49: 182. 1902.)

Calcicole: sea cliffs (Bic); river ledges (Ann.); alpine cliffs (Alb.; Tbl.; Mtt.; Col.).

Arctic circumpolar, alpine: Alaska, Yukon, Mack., Ellesmere, Devon, Baffin, n. Lab., and Nfld., southw. to B.C., the Great Lakes region, and the Gaspe Peninsula; Greenland; Spitsbergen; Eurasia.

2b. **T. spicatum,** var. **molle** (Michx.) Beal.

Calcicole: sea cliffs (Bic); river ledges (Cap Chat.; Mad.; PCa.; Mat.).

Arctic American: Alaska, Yukon, Mack. (Mack. R. Delta, Coronation Gulf), nw. coast Hudson Bay, southw. to s. B.C. and Gaspe.

3. T. FLAVESCENS (L.) Beauv. [Hs]

Roadside (Rim.).

European: naturalized throughout temperate N.A.

18. DESCHAMPSIA Beauv.

a. Glumes acuminate, longer than the florets; lemmas strigose near the summit, erose-truncate and short-ciliate at apex; awn inserted about the middle, bent; spikelets 5-6 mm. long, purplish; no tufts of basal leaves; blades flat, thin..1. *D. atropurpurea*

a. Glumes acute or blunt, not longer than the florets; awn inserted near the base; basal leaves tufted; blades firm or filiform.

  b. Lemmas scabrous, 4-toothed, the awn bent, twisted, twice as long as the lemma; spikelets 4-5 mm. long, on smooth branches, the florets approximate; basal leaves involute-setaceous, numerous; sheaths scabrous.....................2. *D. flexuosa*

  b. Lemmas smooth, erose-truncate, the awns straight, articulated at base and deciduous, little longer than the lemma; spikelets on scabrous branches, the florets distant; basal leaves flat or involute, less numerous; sheaths smooth.

    c. Spikelets 3-4·5 mm. long; panicle lax, rather diffuse during anthesis...3. *D. caespitosa,* var. *glauca*

    c. Spikelets 4·5-7 mm. long; panicle commonly contracted, occasionally diffuse, during anthesis.................................3a. *D. caespitosa,* var. *littoralis*

1. **D. atropurpurea** (Wahl.) Scheele. [Hs]

Calcicole: calcareous alpine meadow (Tbl.); alpine meadows and slopes (Tbl.; Log.; Mtt.; Ftn.).

Alpine serpentine barrens (Alb.); gravel outwash plain below Mt. Albert (R. du Diable).

Arctic ?circumpolar, alpine: gap in western N.A., where replaced by var. *paramushirensis* Kudo; n. Que. (Wolstenholme) and n. Lab. to Nfld. and mts. of N. Eng.; arctic and alpine Europe; in e. Asia, var. *paramushirensis*.

2. **D. flexuosa** (L.) Trin. [Hs] Hair Grass

Slaty ridges (Bic); river alluvium (Ann.); alpine schists (Str.; Bln.); alpine serpentine barrens (Alb.); gravel outwash plain below Mt. Albert (R. du Diable); alpine situations (Tbl.; Log.; Mtt.; Ftn.).

(Arctic-)boreal circumpolar, alpine: Aleutian Is. and Alaska to n. Lab. and Nfld., southw. to Wis., Mich., Tenn. and N.C.; Greenland; Iceland; Faeroes; arctic Europe; Asia; S. Am.; E. Africa.

3. **D. caespitosa** (L.) Beauv., var. **glauca** (Hartm.) Lindm., *See* Fernald, Rhod. 28: 153. 1926. [Hs]

Gravel flats (Ann.; Mat.); shore (Lac Matapédia); habitat not stated (Mad.; Bon.; PCa.; GCa.).

Boreal circumpolar: Alaska, Yukon, Mack. (Mack. R. Delta, Great Bear L.), Ont., Que., and Nfld., southw. to Calif., Ariz., Ill., Ohio, Pa., and n. N.J.; Faeroes; Europe.

3a. **D. caespitosa,** var. **littoralis** (Reut.) Richter. (*D. caespitosa,* var. *alpina* Vasey; *See* Fernald, Rhod. 28: 153. 1926.)

Mossy alpine serpentine barrens and alpine brooksides (Alb.).

Arctic circumpolar, alpine: Alaska, Ellesmere, Baffin, Hudson Bay, n. Lab., and Nfld., southw. in the mts. to Calif., Utah, and Colo., and Gaspe; Faeroes; Eurasia.

19. AVENA (Tourn.) L.

(Oats)

1. A. FATUA L. [T] Wild Oats

Railway ballast (Gnd.; Mat.; Sayabec).

European: adventive in N.A. from B.C. to e. Que. and Nfld., southw. to Calif. and Mo.

20. MILIUM L.

(Millet Grass)

1. M. EFFUSUM L. [Hsr]

Damp woods (Bic; Cap Chat; Prr.; Lou.; PCa.; GCa.); ravine at foot of mountain (Lyl.); alpine schists (Alb.); subalpine meadows (Tbl.; Log.; Mtt.; Ftn.).

Eurasian: naturalized in eastern N.A. from Minn. to Lab. and Nfld., southw. to Ill. and N.S.; Iceland.

21. ORYZOPSIS Michx.

(Mountain Rice)

a. Spikelets 2·5-4 mm. long, in small diffuse panicles; awns straight, 1-2 mm. long or wanting; blades mainly on the stem, mostly involute, smooth or slightly scabrous, less than 2 mm. wide; glumes 3-4 mm. long, obscurely 5-nerved, obtuse...1. *O. pungens*

a. Spikelets 6-8 mm. long, in a narrow contracted panicle; awns flexuous, angled, scabrous, 5-10 mm. long; blades mostly basal, flat when fresh, 4-8 mm. wide, scabrous especially on the glaucous lower surface; glumes 6-8 mm. long, about 7-nerved, short-ciliate at the apiculate summit..............................2. *O. asperifolia*

1. **O. pungens** (Torr.) Hitchc. [Grh]

Dry rocks (St. Simon; Bic).

Boreal American: B.C. to Lab., southw. to S. Dak. and Pa.

2. **O. asperifolia** Michx. [Grh]

Slaty sea ledges (Bic); dry woods (Cap Chat; Ann.; Mad.); subalpine clearing (Alb.).

Boreal American: B.C., Hudson Bay, Nfld., southw. to N. Mex. and Pa.

22. MUHLENBERGIA Schreb.

a. Blades setaceous, 1-5 cm. long, usually involute; panicle 1-7 cm. long, 2-4 mm. thick; glumes 1 mm. long, obtuse or abruptly acute; lemma 2·5-3 mm. long; culm slender, wiry, nodulose-roughened..............................1. *M. Richardsonis*

a. Blades flat, more than 3 mm. wide; panicle well developed; glumes equalling or exceeding the lemmas.

  b. Glumes with a slender awn as long as or longer than the body; panicle very dense and spike-like but interrupted, long peduncled, usually livid, bristly..2. *M. glomerata,* var. *cinnoides*

  b. Glumes mucronate or aristate; panicle branched, the spikelets more or less crowded on the rather short appressed or ascending branches, usually purple...3. *M. mexicana*

1. **M. Richardsonis** (Trin.) Rydb. [Hsr]

Calcicole: river gravels (Gnd.; Mat.; Res.).

Disjunct American: B.C. to Mack. (Great Bear Lake) and Sask., southw. to Calif. and N. Mex.; e. Que. and Anticosti to N.B. and Me.

2. **M. glomerata** (Willd.) Trin., var. **cinnoides** (Link) Hermann. [Hsr] (*M. racemosa* of Gray's Man., ed. 7; *M. setosa,* var. *cinnoides* (Link) Fernald; *See* Rhod. 45: 238. 1943, and 48: 64. 1946.)

Calcicole: sea cliffs (Lbn.; Pcé.); inland cliffs (Tra.); river gravels (Mad.; Jhn.; Pab.; Bon.; Mat.); damp sand flats (New Richmond); swamp (Bic).

(Boreal-)temperate American: Alb. to Mingan Is. and Nfld., southw. to Oreg. and n. Mass.; somewhat more northern than the typical form.

3. **M. mexicana** (L.) Trin. [Hsr] (*M. foliosa* of Gray's Man., ed. 7.)

Calcicole: river shores (Rim.; Mat.).

Temperate American: Mont. to e. Que., southw. to Ariz. and N.C.

23. BRACHYELYTRUM Beauv.

1. **B. erectum** (Schreb.) Beauv., var. **septentrionale** Babel, Rhod. 45: 260. 1943. [Hsr] Bearded Short-husk

Edge of river (Rim.); rich woods at mountain base (Nic.).

(Boreal-)temperate eastern American: Minn. to Nfld., southw. to N.J., and in the mts. to W. Va.

24. PHLEUM L.

a. Panicles cylindric, several times as long as wide; awn of glumes 1 mm. long; upper sheath not inflated..1. *P. pratense*

a. Panicles narrowly ellipsoid or short-cylindric, not more than twice as long as wide; awn of glumes 2 mm. long; upper sheath inflated....................2. *P. alpinum*

1. P. PRATENSE L. [Hs] Timothy

Fields (Mat.); clay beach (Fla.); trail in woods (Irn.); river gravels (Pab.); alpine schists (Bln.). General.

Eurasian: cultivated for hay throughout temperate N.A.; escaped from cultivation and naturalized.

2. **P. alpinum** L. [Hs] Alpine Timothy

Calcicole: sandy river alluvium (Ann.); river ledges (Bon.; Mat.); calcareous alpine meadow (Tbl.); damp open slopes (Alb.; Tbl.; Log.; Mtt.; Ftn.; Pem.).

Boreal circumpolar, alpine: Aleutian Is., Alaska, Yukon, Mack., s. Hudson Bay, n. Que., Lab., and Nfld., southw. to Calif., N. Mex., S. Dak., and n. Mich., and in the mts. to Me. and N.H.; s. Greenland; Iceland; Eurasia.

25. ALOPECURUS L.

(Foxtail Grass)

1. **A. aequalis** Sobol. [Hs] (*A. geniculatus*, var. *aristulatus* Torr.)

Swampy ground (Bic; Cap Chat; Drt.; PCa.); brackish pool in salt marsh (Bnc.).

(Arctic-)boreal circumpolar: Aleutian Is., Alaska, Yukon, Mack. (Great Bear L.), n. Lab., and Nfld., southw. to Calif., N. Mex. and Fla.; w. and e. Greenland; Iceland; Eurasia.

26. CINNA L.

(Wood Reed Grass)

1. **C. latifolia** (Trev.) Griseb. [Hs]

Sea cliffs (Bic; Plr.); damp places (Grand Lac Matane); cold ravine at foot of mountain (Lyl.); alpine situations (Alb.; Log.).

Boreal circumpolar: Alaska and Mack. to Lab. and Nfld., southw. to Calif. and N.C.; Eurasia.

27. AGROSTIS L.

(Bent Grass)

[Malte: Commercial Bent Grasses (Agrostis) in eastern Canada; Nat. Mus., Canada, Bull. 50: 105-126. 1928.]

a. Palea at least one-third as long as the lemma; panicle-branches rigid; rhizomes or stolons present.

b. Ligule longer than broad, generally 2-4 mm. long on the lower leaves, frequently whitish and translucent, membranous, rounded or pointed at the apex; spikelets on short branchlets, numerous towards the axis of the panicle.

c. Panicles open only during anthesis, the short branches becoming erect and appressed into a compact panicle at maturity....1. *A. stolonifera*, var. *compacta*

c. Panicles open during and after anthesis, the branches longer..1a. *A. stolonifera*, var. *major*

b. Ligule broader than long, generally 0·5-1 mm. long on the lower leaves, transparent, brownish or somewhat hyaline, truncate; spikelets not more crowded at the base of the branches; branches divaricate-spreading after anthesis; lemma awnless ....2. *A. tenuis*

a. Palea obsolete or absent; panicle-branches slender or capillary; rhizomes absent.

b. Panicle diffuse, the scabrous capillary branches re-branching at or above the middle, the branchlets spikelet-bearing towards the ends.

c. Panicle one-quarter to one-third the full height of the culm, the mature and strongly divergent or reflexed flexuous branches strongly swollen at the base; ligules 4-7 mm. long.

d. Spikelets 2-3 mm. long; lemma awnless, less than 2 mm. long, not evidently nerved; panicle very diffuse..........3. *A. scabra*

d. Spikelets 3·2-4·3 mm. long; lemma awned, 2-2·5 mm. long, conspicuously dark-nerved; panicle lanceolate to narrowly ovoid, not diffuse..........3a. *A. scabra*, var. *septentrionalis*

c. Panicle smaller and more regularly ovoid, one-sixth to very rarely one-half the length of the culm, the branches shorter, stiffer or merely arching, scarcely swollen at the base: ligules 1·5-rarely 4 mm. long; lemmas awned..........4. *A. geminata*

b. Panicle open but not diffuse, the branches branching at or below the middle.

c. Lemmas awnless; spikelets 2-3 mm. long; panicles rather lax, sometimes delicate and divaricately spreading; blades flat, as much as 6 mm. wide....5. *A. perennans*

c. Lemmas awned from about the middle; spikelets (glumes) 2-4 mm. long.

d. Spikelets 2-3 mm. long; panicle 1·5-14 cm. long; culms 0·4-4·5 dm. high; blades 0·2-2 mm. broad, flat or more commonly involute........6. *A. borealis*

d. Spikelets 2·8-4 mm. long; panicle 3-17 cm. long; culms 1·5-7·5 dm. high; blades 1-4 mm. broad, flat..........6a. *A. borealis*, var. *americana*

1. **A. stolonifera** L., var. **compacta** Hartm. [Hsr] (*A. alba*, var. *maritima* Meyer.)

Dry conglomerate rocks (Bic); fields (Irn.); wet places (Baie des Sables; Dan.); inland cliffs (Tra.); river flats and gravels (Ann.; Drt.; Yrk.; Mat.; St. Tharsicius); edge of marly pond (Oie); beach (Mtn.).

(Boreal-)temperate circumpolar: Aleutian Is. and Alaska to Côte Nord and Nfld., southw. to Calif. and Tex.; w. Greenland; Eurasia.

1a. **A. stolonifera,** var. **major** (Gaud.) Farwell. (*A. alba*, var. *major* Gaud.)

Field (Canton Jetté, Matapédia co.).

Range of the above.

2. A. TENUIS Sibth. [Hsr] (*A. vulgaris* With.; *A. alba*, var. *vulgaris* (With.) Thurb.)

Cliffs (Pcé.; Tra.); river gravels (Bon.); roadside (Val.); brackish ground (Gpe.); sea beach (Pén.; Cha.; Pointe à la Garde); cedar swamp (New Richmond); wet places (PCa.).

Eurasian: naturalized in N.A. from B.C. to Nfld., southw. to Calif. and Md.; Iceland; Faeroes.

Forma *aristata* (Parnell) Wiegand, with most of the lemmas awned, has been collected at Bic and Ste. Irène.

3. **A. scabra** Willd. [Hs] (Not *A. hyemalis* (Walt.) BSP.; *See* Fernald, Rhod. 35: 208. 1933.)

Swampy ground (Bic; Mét.; R. Blanche; Ann.); cedar swamp (New Richmond); alluvial woods (Dou.); roadside (Mad.); dried marl pond (Oie); calcareous ledges (Lac Pleureuse (specimens distributed as *A. idahoensis* Nash); Tra.); gravel slope (Alb.).

Boreal American: Alaska, Yukon, and Mack. to Lab. and Nfld., southw. to Calif. and Pa.; e. Asia.

3a. **A. scabra,** var. **septentrionalis** Fernald, Rhod. 35: 209. 1933.

Alpine meadow (Tbl.).

(Boreal-)temperate eastern American, alpine: e. Que. to Lab. and Nfld., southw. to N.S.

Var. *septentrionalis*, forma *setigera* Fernald, with awned lemmas, is the type represented in the above collection.

4. **A. geminata** Trin. [Hs] (*A. scabra*, var. *geminata* (Trin.) Hultén, Fl. Alaska and Yukon, p. 156. 1942.)

River banks (Ann.; PCa.; GCa.); meadow (Lac Mont Louis); edge of subalpine lake (Lac des Américains, Tbl.).

Disjunct American: Aleutian Is., s. coast of Alaska, Yukon, southw. to Calif.; Côte Nord and Nfld. southw. to N.H.

Forma *exaristata* Fernald, with awnless lemmas (Rhod. 35: 211. 1933), has been collected from the muddy border of a small lake, north fork of Madeleine River (type station), and from the gravelly slope of an alpine brook, Mt. Albert.

5. **A. perennans** (Walt.) Tuckerm. [Hs]

Dry places (Val.); river edge (Dou.).

Temperate eastern American: Minn. to e. Que., southw. to e. Tex and Fla.

6. **A. borealis** Hartm. [Hs]

Slaty ledges (Bic); river bank (PCa); alpine meadow (Tbl.); alpine ravine in serpentine tableland (Alb.).

Arctic circumpolar, alpine: Aleutian Is., Alaska, Yukon, Mack., n. Hudson Bay, Baffin, n. Lab., and Nfld., southw. to B.C. and n. Vt., and mts. of W. Va. and N.C.; w. and e. Greenland; arctic Eurasia.

6a. **A. borealis,** var. **americana** (Scribn.) Fernald, *See* Rhod. 35: 204. 1933.

River banks (Cap Chat; Ann.; GCa.; Nou.); alpine slopes (Alb.; Tbl.; Ftn.); subalpine meadow (Log.).

(Boreal-)temperate eastern American, alpine: e. Que. to w. Nfld., southw. in the mts. to Me. and N.H.

28. CALAMAGROSTIS Adans.

(Reed Bent Grass)

[Stebbins: A revision of some North American species of Calamagrostis; Rhod. 32: 35-57. 1930. Louis-Marie: The Ancylatheran Calamagrostis of eastern North America: Rhod. 46: 285-305. 1944.]

a. Awn longer than the glumes and protruding at the tip of the spikelets, bent in the middle and twisted below; summit of the lemma and palea emarginate-dentate; flowering stems with 1-2 cauline leaves, callus-hairs about one-third as long as the lemma.
  b. Spikelet purple, 5·5-12 mm. long; lemma bearing an awn 5-10 mm. long; grain reddish..1. *C. purpurascens*
  b. Spikelet mostly green, 4-4·6 mm. long; lemma 3-4 mm. long, bearing an awn 4-5 mm. long; grain olive-green..2. *C. Lepageana*

a. Awn included or scarcely longer than the glumes, straight.
  b. Panicle loose and open, the branches spreading at flowering time; lemma membranous-translucent, at least in its upper third, the nerves prominent, the tip erose or 4-toothed; callus-hairs equalling or exceeding the lemma, of approximately equal length except for an outer ring of shorter hairs.
    c. Spikelets 2-3·8 mm. long; glumes rounded on the back, weakly keeled, acute or acuminate; lemma 1·7-3 mm. long, awned near the middle..3. *C. canadensis*

- c. Spikelets 3·8-6 mm. long; glumes narrow, strongly keeled, distinctly acuminate; lemma 3-4·2 mm. long, awned on the lower third.
  - d. Spikelets 3·8-4·5 mm. long; glumes often hyaline on the tip and on the margin, short-scabrous on the keel, elsewhere minutely pubescent-scabrous; lemmas 3-3·5 mm. long........................3a. *C. canadensis*, var. *robusta*
  - d. Spikelets 4·5-6 mm. long; glumes usually thick and opaque throughout, ciliate on the keel, elsewhere pubescent; lemmas 3·5-4·2 mm. long..3b. *C. canadensis*, var. *Langsdorfi*
- b. Panicle more or less contracted, its rigid branches appressed or ascending even at flowering time; lemma firm and opaque, the nerves frequently indistinct; callus-hairs shorter than the lemma, of markedly unequal length, those at the sides of the lemma distinctly longer and tufted.
  - c. Foliage and culms harsh and scabrous; ligules of the upper culm-leaves 2·5-8 mm. long, their margins erose or lacerate.
    - d. Spikelets 4-5·5 mm. long; lemma 3·5-4 mm. long; palea 2·7-3·2 mm. long..4. *C. inexpansa*, var. *robusta*
    - d. Spikelets 3-4·5 mm. long; lemma 2·5-3·5 mm. long; palea 1·7-2·6 mm. long......................................4a. *C. inexpansa*, var. *brevior*
  - c. Foliage smooth, the leaves occasionally scabrous on the tip, the margins, and the upper surface; ligules of the upper culm-leaves 1·5-3·5 mm. long, their margins entire or slightly erose, truncate; spikelets 3-5 mm. long; lemma 1·8-3·8 mm. long; palea 1·2-2·5 mm. long.
    - d. Culms 3-10 dm. high; panicle 5-15 cm. long; callus-hairs one-half to three-quarters the length of the lemma; awn inserted one-quarter to one-third of the way up the lemma....................................5. *C. neglecta*
    - d. Culms 1-4 dm. high; panicle 2-5 cm. long; callus-hairs one-quarter to one-half the length of the lemma; awn inserted one-third to one-half the way up the lemma......................................5a. *C. neglecta*, var. *borealis*

1. **C. purpurascens** R. Br. [Hsr]

Calcicole: " . . .the only known station in the East (south of Greenland) a single colony on one of the highest cliffs of Bic, Quebec" (*See* Fernald, Rhod. 35: 213. 1933).

Arctic American: Aleutian Is., Alaska, Yukon, Mack., Victoria I., n. Baffin, southw. to Calif., Colo., S. Dak., and e. Que.; w. and e. Greenland; e. Asia.

2. **C. Lepageana** Louis-Marie, Rhod. 46: 303-304. 1944. [Hsr]

Calcicole: limestone ledges, alt. about 2,600 feet (Mont-Commis, St. Donat, Rimouski co.) (type station).

Local endemic: known only from the type station.

3. **C. canadensis** (Michx.) Nutt. [Hsr]

Slaty ledges (Bic); cedar swamp (Cap Chat); river alluvium (Ann.); meadows (Yrk.; Mat.; Lac Matapédia); sea beach (St. Simon); alpine schists (Bln.). General.

Boreal American: Alaska, Yukon, and Mack. to Côte Nord and Nfld., southw. to Calif., Kans., Mo., N.C., and Md.

3a. **C. canadensis,** var. **robusta** Vasey.

Meadows and swamps (Bic; Mtn.); river alluvium (Ann.); granitic detritus by alpine pond (Tbl.); alpine situation (Alb.).

(Arctic-)boreal American, alpine: Alaska, Yukon, Mack., Hudson Bay (Churchill), n. Lab., southw. in the mts. to Calif. and N.C.; e. Asia.

3b. **C. canadensis,** var. **Langsdorfi** (Link) Inman. (*C. Langsdorfi* (Link) Trin.)

Calcicole: sea cliffs (Prr.); wet marly places (Tng.); rocky shore (Bon. I.); alpine schists (Alb.; Log.; Mtt.; McNab).

Arctic circumpolar, alpine: Aleutian Is., Alaska, Yukon, Mack., Somerset I., Baffin, Hudson Bay, n. Lab., and Nfld., southw. in the mts. to Calif., Colo., and N.E.; Great Lakes region; Greenland; arctic and alpine Eurasia.

4. **C. inexpansa** A. Gray, var. **robusta** (Vasey) Stebbins. [Hsr] (*C. hyperborea* Kearney, in part.)

Calcicole: dry talus of slaty cliffs (Bic; Prr.; Plr.; Pcé.; Bon. I.); border of alpine pond (Tbl.); alpine meadow (Log.); alpine serpentine barrens (Alb.).

Disjunct American, alpine: Alaska, Yukon, and Alb. to Oreg. and Colo.; Great Lakes region; e. Que. and Nfld.

4a. **C. inexpansa,** var. **brevior** (Vasey) Stebbins.

Calcicole: sea cliffs and ledges (Bic; Prr.; Pcé.; Bon. I.); river ledges (Bon.); damp beach (Sacré-Coeur).

(Boreal-)temperate American: Alaska, Yukon, and Mack. to Nfld., southw. to Calif., Utah, Colo., Nebr., Ind., and Vt.

Stebbins states that "A form from Bic......has the spikelets of this variety, but the smooth foliage and short ligules of *Calamagrostis neglecta.* It may be a hybrid between these two".

5. **C. neglecta** (Ehrh.) Gaertn., Meyer & Scherb. [Hsr]

Calcicole: river gravels (Yrk.); wet places (Dan.).

Halophyte: brackish marshes (Bic; Bnc.; Bon.).

Arctic circumpolar: Aleutian Is., Alaska, Yukon, Mack., Devon, Baffin, Hudson Bay, n. Lab., and Nfld., southw. to Calif., Colo., the Great Lakes region, and n. Me.; Greenland; Iceland; Spitsbergen; arctic and alpine Eurasia.

5a. **C. neglecta,** var. **borealis** (Laestad.) Kearney.

Springy margin of small alpine pond (Alb.).

Northern part of the range.

29. AMMOPHILA Host
(Beach Grass. Marram)

1. **A. breviligulata** Fernald, Rhod. 22: 71. 1920. [Grh] (*A. arenaria* of Gray's Man., ed. 7.)

Halophyte: brackish marsh (Bic).

Psammophilous halophyte: sea beach (Pén.).

(Boreal-)temperate eastern American (maritime): e. Que. and Côte Nord to Nfld., southw. to N.C.; one of the maritime elements in the flora of the Great Lakes.

30. SPARTINA Schreb.
(Salt Marsh Grass. Cord Grass)

a. Blade more than 5 mm. wide, flat towards the base and inrolled towards the tip when fresh; plants with stout upright culms 10-20 dm. high.

b. First glume as long as the lemma, very rough-ciliate on the keel; second glume tapering to an awn-like tip 7 mm. long; inflorescence open, purplish, and slender-waving..1. *S. pectinata*

b. First glume about half as long as the lemma, rarely smooth; second glume without the awn-like long tip, barely exceeding the lemma; inflorescence erect, crowded, yellowish..2. *S. alterniflora*

a. Blades less than 3 mm. wide, involute even when fresh; plants with slender decumbent culms less than 2 mm. in diameter, growing in dense leafy mats, mostly 3-6 dm. high ....3. *S. patens*

1. **S. pectinata** Link. [Hsr] (*S. Michauxiana* Hitchc.)

Edge of stream in tidal bay (Bic); swampy ground (Res.); brackish water (Trl.; Drt.; Mal.; Dan.; Mar.; Car.; Nou.).

Boreal American: Mack. to Nfld., southw. to Oreg., Utah, N. Mex., Tex., Ark., and N.C.

2. **S. alterniflora** Lois. [Hsr]

Halophyte: salt marshes (Bic; Drt.; Dou.; Bnc.; Bon.; Car.).

Amphi-Atlantic (maritime): e. Que., Côte Nord, and Nfld., southw. along the tidal marshes to Fla. and Tex.; highly localized along the Atlantic coast of Europe.

3. **S. patens** (Ait.) Muhl. [Hsr]

Halophyte: salt marshes (Bic; Pointe au Père; Pas.; Mar.).

Amphi-Atlantic (maritime): along the coast from e. Que. and Nfld. to Fla. and Tex.; highly localized along the Atlantic coast of Europe.

31. BECKMANNIA Host
(Sloughgrass)

1. **B. Syzigachne** (Steud.) Fernald. [T] (*B. erucaeformis* of Gray's Man., ed. 7.)

Swampy soil (Mtn.).

Boreal American: Alaska, Yukon, Mack., Hudson Bay (Churchill), Ont., and Que., southw. to Calif., N. Mex., Kans., and Ohio; e. Asia; with the European-western Asiatic *B. erucaeformis*, boreal circumpolar.

32. PHALARIS L.
(Reed Canary Grass)

1. **P. arundinacea** L. [Grh]

Calcicole: river gravels (Cap Chat; Ann.; Drt.; Yrk.; Jhn.; Gnd.; Bon.; PCa.; GCa.; Nou.; Res.); edge of marly pond (Oie); wet places (Rim.; Lac du Club; Marsouins; Mar.; Zén.).

Boreal circumpolar: Alaska and Mack. to Mingan Is. and Nfld., southw. to Calif., Ariz., Tex., Ky., and N.C.; Faeroes; Eurasia.

33. HIEROCHLOE R. Br.
(Sweet Grass. Holy Grass)

a. Leaves scabrous on the margins; panicle pyramidal, 4-12 cm. long, open; spikelets 5 mm. long, brownish; staminate lemmas awnless......................1. *H. odorata*

a. Leaves smooth, the upper sheaths inflated; panicle contracted, few-flowered, 2-5 cm. long; spikelets 7-8 mm. long, olivaceous; second staminate lemma with a bent awn 5-8 mm. long..2. *H. alpina*

1. **H. odorata** (L.) Wahl. [Hsr] *See* Fernald, Rhod. 19: 152. 1917.

Calcicole: sea ledges (Bic; Rim.; Mét.; Srl.; Marsouins); river gravels (Drt.; Jhn.; Gnd.; Nou.; Res.); alpine meadows and slopes (Alb.; Tbl.; Log.; Mtt.).

Psammophilous halophyte: sea beach (Bic).

(Arctic-)boreal circumpolar (essentially maritime): Alaska, Yukon, Mack. (Great Bear L., Great Slave L.), Hudson Bay (Churchill), n. Que., Ungava Bay, n. Lab., and Nfld., southw. to Oreg., Ariz., Nebr., Ind., and N.J.; Iceland; n. Eurasia.

2. **H. alpina** (Sw.) R. & S. [Grh]

Calcareous cliffs above Lac des Américains (Tbl.); damp rocks and mossy banks (Alb.); alpine schists (Log.; Ftn.; Bln.); gravel outwash plain below Mt. Albert (R. du Diable).

Arctic circumpolar, alpine: Aleutian Is., n. Alaska, Yukon, Mack., Victoria I., Ellesmere, Devon, Bylot I., n. Baffin, Melville, Southampton I., n. Lab., and Nfld., southw. to B.C. and Man. and in the mts. to N.Y.; Greenland; Spitsbergen; arctic and alpine Eurasia.

34. ANTHOXANTHUM L.

(Sweet Vernal Grass)

1. A. ODORATUM L. [Hs]

Field (For.).

Eurasian: naturalized throughout temperate N.A. from B.C. to Nfld., southw. to Calif. and La.; Greenland (introduced); Faeroes; Iceland.

35. LEERSIA Swartz

(Rice Cut-grass)

1. **L. oryzoides** (L.) Sw. [Hsr]

Wet places (Rivière Ouest); alluvial thickets (Drt.).

(Boreal-)temperate circumpolar: Wash. to Nfld., southw. to Calif. and Fla.; South America; Eurasia.

Forma *inclusa* (Wiesb.) Dorfl., with the inflorescence enclosed in the inflated sheaths or breaking out through the sides, never exserted far beyond the top of the sheath, is the form represented in the above collection. It is readily identified by the sharp scabridity and the dense fringe of reflexed white hairs at the culm-nodes.

36. ECHINOCHLOA Beauv.

(Barnyard Grass)

1. E. CRUSGALLI (L.) Beauv. [T]

Garden (Bic); waste places (Rim.; Pas.).

European: naturalized throughout temperate N.A. from Wash. to e. Que., southw. to Calif. and Fla.

37. DIGITARIA Scop.

(Crab Grass. Finger Grass)

a. Lower blades and sheaths pilose; plants erect; panicle-branches 4-6, joined at nearly the same point to the main axis; second glume only half the length of the spikelet ....1. *D. sanguinalis*

a. Lower blades and sheaths glabrous; plants usually widely spreading; panicle branches 2-4, more or less separated; second glume nearly as long as the spikelet............ ....2. *D. Ischaemum*

1. D. SANGUINALIS (L.) Scop. [T]
Railway ballast (Mat.).
Eurasian: naturalized throughout temperate N.A.

2. D. ISCHAEMUM (Schreb.) Muhl. [T]
Railway ballast (Rim.).
Eurasian: naturalized throughout temperate eastern N.A.

38. PANICUM L.

(Panic Grass)

1. **P. capillare** L. [T] Old Witch Grass
Railway ballast (Mat.).
Temperate American: B.C. to e. Que., southw. to Colo., Tex., and Fla.

39. SETARIA Beauv.

(Fox-tail Grass)

a. Fruit disarticulating with the spikelet below the glumes, leaving a cup-shaped scar; panicle cylindrical, not interrupted...................1. *S. viridis*, var. *Weinmanni*
a. Fruit disarticulating above the glumes; panicle large, usually much interrupted.... ....2. *S. italica*

1. S. VIRIDIS (L.) Beauv., var. WEINMANNI (R. & S.) Brand [T]

Dry slaty field (Bic); waste places (Trl.; Bon.); railway ballast (Mat.); beach (Car.).

Eurasian: naturalized throughout temperate N.A.; differs from the species in its depressed or prostrate habit, narrower leaves, and slender spike (*See* Fernald and Wiegand, Rhod. 12: 133-134. 1910).

2. S. ITALICA (L.) Beauv. [T]
Waste places (Rim.).
Eurasian: widely cultivated and escaped throughout temperate N.A.

16. CYPERACEAE

(Sedge Family)

a. Flowers all perfect; spikes all of one sort; achenes bare.
  b. Scales of the spikelet strictly 2-ranked, folded and keeled.
    c. Inflorescence terminal; flowers without bristles; achenes beakless; style 2-cleft; scales lustrous; stem solid, more or less 3-angled....................1. *Cyperus*
    c. Inflorescence lateral; flowers with 6-9 bristles; achenes long-beaked; stem hollow, round ....2. *Dulichium*

b. Scales of the spikelet imbricated, spirally arranged.
  c. Base of the style persistent as a tubercle on the achene.
    d. Stem leafless; spikelet solitary, many-flowered, with only one of the lower scales empty .... 3. *Eleocharis*
    d. Stem leafy; spikelets grouped, 1-several-flowered, with 2-many of the lower scales empty .... 4. *Rynchospora*
  c. Base of the style not persistent as a tubercle.
    d. Perianth bristles less than 10, short; inflorescence often very compound.. 5. *Scirpus*
    d. Perianth bristles numerous, silky, elongate; inflorescence simple or somewhat compound .... 6. *Eriophorum*

a. Flowers monoecious in the same or in separate spikes, rarely dioecious; achene enclosed in a sac (perigynium) .... 7. *Carex*

1. CYPERUS (Tourn.) L.

(Galingale)

1. **C. rivularis** Kunth. [T]

Sea beach (Fla.; Mét.).

Temperate eastern American: Minn. to e. Que., southw. to Ark. and N.C.

2. DULICHIUM PERS.

1. **D. arundinaceum** (L.) Britt. [Hel]

Swampy ground (Bic; Rim.; Lac à Foin).

(Boreal-)temperate American: B.C. to Nfld., southw. to Tex. and Fla.

3. ELEOCHARIS R. Br.

(Spike Rush)

[Fernald and Brackett: The representatives of Eleocharis palustris in North America; Rhodora 31: 57-77. 1929. Svenson: Monographic studies in the genus Eleocharis; Rhodora 31: 121-135, 152-163, 167-191, 199-219, 224-242. 1929; 34: 193-203, 215-227. 1932; 36: 377-389. 1934; 39: 210-231, 236-273. 1937; 41: 1-19, 43-77, 90-110. 1939.]

a. Achenes lenticular or biconvex; styles mostly 2-cleft.
  b. Plants tufted; annuals with fibrous roots; stems rather soft; bristles much exceeding the whitish to pale brown achene; spikelets globose-ovoid.
    c. Tubercle (style base) depressed-conic, concaved towards the tip, nearly or quite as broad as the achene, one-third as high; achene 1-1·5 mm. long; style 3-cleft; stamens 3; scales dull brown.. 1. *E. obtusa*
    c. Tubercle deltoid-conic, higher than broad, less than two-thirds as broad as the achene, about one-half as high; achene 1 mm. long; stamens 2-3; scales softer, reddish to purplish brown.. 2. *E. ovata*
  b. Plants not tufted; stoloniferous perennials, often with rhizomes.
    c. Basal scales of spikelet usually 2 or 3 below the thinner fertile scales, the lowest not encircling the base of the spikelet.. 3. *E. Smallii*
    c. Basal scale of spikelet solitary and spathiform, completely encircling the base of the spikelet; achenes smooth to faintly reticulate.
      d. Culms elongate-filiform; spikelets 30-40-flowered with obtuse scales.. 4. *E. calva*
      d. Culms usually thicker, frequently inflated or rigidly flattened; rhizomes thread-like; spikelets few-flowered, the 5-30 scales usually lustrous purple; sea coasts .... 5. *E. halophila*

a. Achenes triangular or turgid; style 3-cleft.

b. Tubercle confluent with the summit of the achene.

c. Scales all flower-bearing, chocolate-brown, with pale scarious margins and tip; culm slender, 1·5-4 dm. high; spikelets 4-7 mm. long; achenes 2-3 mm. long, triangular or plano-convex, prominently reticulate.................6. *E. pauciflora*, var. *Fernaldii*

c. Scales green to yellowish, often dull brown on the sides, the lowest scale empty, half the length of the spikelet; culms capillary, 2-7 cm. high; spikelets 2-3·5 mm. long; achenes 1-1·4 mm. long, equilaterally triangular with prominent angles, smooth and shining..........7. *E. parvula*

b. Tubercle distinctly articulated with the achene.

c. Achene reticulate, 0·7-1 mm. long; scales ovate-lanceolate, acute, green, with reddish brown sides and scarious margins, usually only a few subtending the mature fruit; stem 2-20 cm. high, capillary, deep green, usually angular and grooved; sheaths loose, reddish striate at base, the apex scarious and somewhat inflated..........8. *E. acicularis*

c. Achene smooth or merely honeycombed or papillose.

d. Tubercle depressed, as wide as or wider than high.

e. Upper sheaths with brown or black tips; spikelets 3-10 mm. long, 20-30-flowered; achene 1-1·1 mm. long, with rounded angles; rootstock thickened..........9. *E. elliptica*

e. Upper sheaths with whitened tips; spikelets 2·5-4·5 mm. long, 8-20-flowered; achene 0·7-1 mm. long, sharply trigonous; rootstock slender....10. *E. nitida*

d. Tubercle conic-subulate, longer than broad, much narrower than the achene; stems tufted; annual plant with fibrous roots..........11. *E. intermedia*

1. **E. obtusa** (Willd.) Schultes. [T]

Wet shores (R. Ouest).

Temperate American: B.C. to Oreg. and Mex.; gap in continental N.A.; Ont. to e. Que., southw. to Tex. and Fla.; Hawaii.

2. **E. ovata** (Roth) R. & S. [T]

Wet places (Bic).

(Boreal)-temperate American: B.C., Man., Ont., Que., and Nfld., and Conn.; Eurasia.

3. **E. Smallii** Britt. [Grh-Hel] (*E. palustris* and its var. *major* of Am. auth.; *See* Svenson in Rhodora 49: 61-67. 1947.)

Calcicole: marly pond (Lac Porc-Epic, Bic); river shores (Cap Chat); cedar swamp (New Richmond); wet places (Mét.; Ren.).

Halophyte: salt marshes (Mad.; Bnc.; PCa.).

Temperate eastern American: Nebr. and Mich. to e. Que., southw. to Mo., Ill., Ind., Pa., and Del.; long confused with the European *E. palustris*, from which it differs in its swollen, bulb-like tubercles, and spikelets not thicker than the culms.

4. **E. calva** Torr. [Grh]

Swampy ground (Albertville).

Temperate American: Wash. and Alb. to e. Que., southw. to Mex. and S.C.; Hawaii; e. Asia.

5. **E. halophila** Fern. & Brackett. [Grh] (*E. uniglumis*, var. *halophila* Fern. & Brackett, Rhod. 31: 72. 1929; 37: 395. 1935.)

Halophyte: brackish shores and salt marshes (Cap.; Manche d'Epée; Drt.; Yrk.; Bnc.; Bon. (type station); Dan.).

Temperate eastern American (maritime): e. Que., N.S., and s. Nfld., and along the coast to Del.

6. **E. pauciflora** (Lightf.) Link, var. **Fernaldii** Svenson, Rhod. 36: 380. 1934. [Grh] (*Scirpus pauciflorus* of Gray's Man., ed. 7.)

Calcicole: dried marl pond (Ste. Adelaide); river banks (Cld.; Mad.); wet meadow (Nou.).

Halophyte: brackish marshes (Tng.; Bon.).

Boreal American: Yukon, Mack. (Great Bear L.), James Bay, Great Lakes region to Nfld., southw. to Iowa, Ill., Ind., Pa., and N.Y.; with the species, boreal circumpolar.

7. **E. parvula** (R. & S.) Link. [T] (*Scirpus nanus* Spreng.)

Halophyte: brackish marshes (Bic; Tng.; Bon.).

(Boreal-) temperate circumpolar (essentially maritime): B.C., Wash., and n. Calif.; replaced in continental western N.A. by var. *anachaeta* (Torr.) Svenson; one of the maritime elements in the flora of the Great Lakes; e. Que. to Nfld., southw. along the coast to La. and Fla.; Cuba; coasts of Europe; Japan; S. Africa.

8. **E. acicularis** R. & S. [Grh]

Dried pond (Bic); river banks (Ann.; Manche d'Epée; R. Ouest).

Arctic circumpolar: Alaska, Yukon, Mack. (Mack. R. Delta, Great Bear L.), n. Hudson Bay, s. Baffin, n. Que., Lab., and Nfld., southw. to Calif., Idaho, Wyo., Nebr., Mo., Ill., Ind., and Fla.; West Indies; Greenland; Iceland; Eurasia.

9. **E. elliptica** Kunth. [Grh] (*E. capitata* (L.) R. Br., var. *borealis* Svenson, Rhod. 34: 200. 1932; *See* also Rhod. 41: 65. 1939.)

Calcicole: river gravels (Mad.; Bon.; Mat.); cedar swamp (Car.); sea ledges (Tng.).

(Boreal-) temperate American: B.C., Man., Ont., Que., and Nfld., southw. to Mont., Ill., Ind., Tenn., and N.J.

10. **E. nitida** Fernald. [Grh]

Swampy places (Rim.; Ann.).

Disjunct American: Alaska (*See* Hultén, Fl. Alaska and Yukon, p. 293); Que. to Nfld., southw. to N.H. and N.S.

11. **E. intermedia** (Muhl.) Schultes. [T] (*E. reclinata* Kunth.; *See* Rhod. 39: 262. 1937; 41: 67. 1939.)

Calcicole: river gravels (Drt.; Bon.; PCa.); river shores (R. Ouest; Cha.).

Temperate eastern American: Minn. to e. Que., southw. to Ill., Ind., and Tenn.

4. RHYNCHOSPORA Vahl

(Beak Rush)

a. Spikelets white or tawny white; bristles 9-15, downwardly barbed; achene oblong-obovate with a narrowed base, scarcely longer than the flattened-awl-shaped tubercle and shorter than the bristles.................................... 1. *R. alba*

a. Spikelets brown; bristles usually 6.

b. Bristles upwardly barbed; achene obovoid, about one-third the length of the bristles, nearly equalling the triangular-sword-shaped acute tubercle.............. 2. *R. fusca*

b. Bristles downwardly barbed; achene oblong-ovoid, stipitate, about half the length of the stout bristles, twice the length of the lanceolate-beaked tubercle.......... 3. *R. capillacea*

1. **R. alba** (L.) Vahl. [Hs]

Swampy ground (Bic; Gnd.; Newport; New Carlisle; Bon.; Nou.).

Boreal circumpolar: Alaska to Côte Nord and Nfld., southw. to Calif., Idaho, Minn., Ky., and Fla.; Eurasia.

2. **R. fusca** (L.) Ait. [Hsr]

Bog (Montagne Blanche, Rimouski co.).

(Boreal-) temperate eastern American: Great Lakes region to Nfld., southw. to Del.; Europe.

3. **R. capillacea** Torr. [Hs]

Calcicole: open spots in cedar swamp at river mouth (Bon.); swampy ground (Newport).

Temperate eastern American: Ont. to e. Que., southw. to Mo. and Del.

5. SCIRPUS L.
(Bulrush)

a. Spikelet solitary; involucre none or reduced to a single bract.

b. Spikelet without bract at base; bristles white and interwoven, 4-7 times longer than the scale, barbless and flattened.................................. 1. *S. hudsonianus*

b. Spikelet subtended by an involucral bract.

c. Terrestrial; bract hardly exceeding the spikelet.

d. Stem cylindrical; bristles smooth; sheath orifice about 1 mm. long, with a firm border; spikelet pale brown or stramineous.. 2. *S. caespitosus*, var. *callosus*

d. Stem triangular; bristles barbed............................ 3. *S. Clintonii*

c. Aquatic; bract twice as long as the spikelet................ 4. *S. subterminalis*

a. Spikelets several or very numerous.

b. Involucral bract single.

c. Involucral bract appearing to be a continuation of the culm; spikelets 1-12; stems triangular, sharply angled.

d. Spikelets crowded into a short distichous spike; scales castaneous, conduplicate, pointed..................................... 5. *S. rufus*, var. *neogaeus*

d. Spikelets distinct, glomerulate; scales ovate, sparingly ciliate, 2-cleft at the apex; anthers tipped with an awl-shaped minutely fringed appendage........ 6. *S. americanus*

c. Involucral bract normal; inflorescence appearing terminal and formed of numerous spikelets, these often in glomerules terminating common peduncles; culms cylindrical, tall.

d. Achene 2 mm. long; scales 2-2·5 mm. long, almost glabrous, ciliate, mucronate, with distinct greenish median nerve; inflorescence lax; spikelets ovoid-cylindric; stems soft.............................. 7. *S. validus*, var. *creber*

d. Achene 2·5 mm. long; scales 3-4 mm. long, more or less viscid-puberulent, red-spotted, aristate; inflorescence generally compact; spikelets cylindric; stems hard .... 8. *S. acutus*

b. Involucral bracts 2 or more.

c. Spikelets 3-30, 1-4 cm. long, almost all sessile; scales drab to castaneous; achenes lenticular.................................. 9. *S. paludosus*, var. *atlanticus*

c. Spikelets very numerous, less than 1 cm. long.
  d. Bristles retrorsely barbed; culms solitary or loosely clustered; plant with thick scaly stolons; spikelets in glomerules.
    e. Lower sheaths red-banded; bristles barbed nearly to the base; scales finely suffused with green and black........................10. *S. rubrotinctus*
    e. Lower sheaths green; bristles barbed only above the middle; spikelets dark brown or dark lead-colour; lower leaves and sheaths nodular-reticulate...... ....11. *S. atrovirens*, var. *georgianus*
  d. Bristles smooth or sparingly upwardly setulose, curly; plant densely or loosely caespitose, not stoloniferous.
    e. Spikelets nearly all in glomerules of 3-15, 3-4 mm. long; bristles very crisp; involucels dull brown with blackish bases......12. *S. cyperinus*, var. *pelius*
    e. Spikelets nearly all single and pedicelled.
      f. Plant slender with leaves 3-5 mm. wide; involucels and scales blackish green; scales 1-2 mm. long..........................13. *S. atrocinctus*
      f. Plant stout, with leaves 5-8 mm. wide; involucels and scales brownish.... ....14. *S. pedicellatus*

SUPPLEMENTARY KEY BASED ON ACHENE CHARACTERS

[Beetle: A key to the North American species of the genus Scirpus based on achene characters; Amer. Midland Nat. 29: 533-538. 1943.]

a. Achene 1·5 mm. long or longer, about 0·75-2 mm. broad, light to dark brown, grey-brown or black, smooth under hand lens magnification.
  b. Achene 5 mm. long, equally tapered at both ends......5. *S. rufus*, var. *neogaeus*
  b. Achene 4 mm. long or shorter, obovate or oval.
    c. Achene not apiculate, oval, light brown..........................3. *S. Clintonii*
    c. Achene apiculate, obscurely so in some cases.
      d. Achene wholly lenticular, 2 mm. broad.
        e. Mature achene deep grey.......................7. *S. validus*, var. *creber*
        e. Mature achene brown.......................9. *S. paludosus*, var. *atlanticus*
      d. Achene plano-convex or compressed to sharply trigonous.
        e. Mature achene grey-brown to black, trigonous, 2-2·5 mm. long........... ....8. *S. acutus*
        e. Mature achene light to dark brown.
          f. Achene 1 mm. or less wide.
            Six elongate white bristles persistent about the achene..1. *S. hudsonianus*
            Bristles shorter; achene prominently apiculate......................... ....2. *S. caespitosus*, var. *callosus*
          f. Achene 2 mm. or more broad.
            g. Achene short-apiculate, 2·5 mm. long................6. *S. americanus*
            g. Achene long-apiculate, 3 mm. long, 2 mm. broad....4. *S. subterminalis*

a. Achene usually 1 mm. long and about 0·5-0 75 mm. broad, whitish or pale brown at maturity, apiculate, smooth.
  b. Bristles neither elongate nor persistent; achene whitish.
    c. Achene lenticular, obovate................................10. *S. rubrotinctus*
    c. Achene plano-convex, sharply apiculate......11. *S. atrovirens*, var. *georgianus*
  b. Elongate bristles persistent about achene.
    c. Achene whitish...13. *S. atrocinctus*
    c. Achene light brown.
      d. Achene lenticular............................12. *S. cyperinus*, var. *pelius*
      d. Achene plano-convex..................................14. *S. pedicellatus*

1. **S. hudsonianus** (Michx.) Fernald. [Hel] (*Eriophorum alpinum* L.)

Calcicole: river ledges and gravels (Ann.; Lou.; Mad.; Cld.; Pab.; Bon.); wet places (Rim.; Trl.; Gnd.; New Carlisle; Oie; Car.; Nou.); edge of subalpine lakes (Lac des Américains, Tbl.); cedar swamp (Bic; Bnc.; Bon.); spruce bog (Rim.).

Boreal circumpolar: Alaska, Yukon, Mack. (Great Slave L.), middle Hudson Bay, Lab., and Nfld., southw. to Mont., Minn., and Conn.; Europe.

2. **S. caespitosus** L., var. **callosus** Bigelow. [Hr] (*S. caespitosus* of Gray's Man., ed. 7; *See* Fernald, Rhod. 23: 24-25. 1921; ssp. *austriacus* (Palla) Asch. & Graebn.; *See* Hultén, Fl. Alaska and Yukon, pp. 290-291.)

Calcicole: river ledges and gravels (Ann.; Gnd.; Pab.; Bon.); marly pond (Anse à la Loutre); subalpine meadow (Tbl.); edge of alpine pond in serpentine barrens (Alb.); alpine bogs (Log.; Ftn.).

Arctic circumpolar: Aleutian Is., Alaska, Yukon, Mack., middle Hudson Bay, s. Baffin, n. Lab., and Nfld., southw. to Wash., Colo., Ill., and N.Y.; w. and e. Greenland; Iceland; Eurasia.

3. **S. Clintonii** Gray. [Hsr]

River gravels (Rim.; Mat.).

Temperate eastern American: Great Lakes region; e. Que. to N.B. and Me.

4. **S. subterminalis** Torr. [Hel]

Edge of lake (Lac des Pins, Rimouski co.).

(Boreal-)temperate American: B.C. to Nfld., southw. to Oreg. and N.J.

5. **S. rufus** (Huds.) Schrad., var. **neogaeus** Fernald, Rhod. 45: 287. 1943. [Hsr] (*S. rufus* of Gray's Man., ed. 7.)

Halophyte: brackish waters and salt marshes (Bic; Rim.; Mtn.; Trl.; Val.; Ros.; Drt.; Yrk.; Jhn.; Mal.; Bnc.; Bon.; PCa.; Nou.; Esc.).

Boreal eastern American (maritime): Sask., Man., Hudson Bay (Churchill), Nfld., southw. to N.S. and N.B.; with the species, boreal circumpolar.

6. **S. americanus** Pers. [Hel]

Halophyte: brackish waters of river estuary (Rim.); brackish marshes (Cha.; New Richmond).

Boreal ?circumpolar: isolated in Alaska; B.C. to James Bay and Nfld., southw. to Calif., Tex., and Fla.; S. Am.; Europe; gap in Asia; Africa.

7. **S. validus** Vahl, var. **creber** Fernald, Rhod. 45. 283. 1943. [Hel]

Halophyte: brackish shores of river estuaries (Drt.; Bon.; PCa.); brackish marshes (Rim.; Mtn.; Nou.).

Boreal American: Alaska, Yukon, Mack. (Great Bear L., Great Slave L.), James Bay, e. Que., and Nfld., southw. to Calif., n. Mex., Okla., Mo., Tenn., and Fla.; West Indies; the typical form is the plant of eastern tropical America.

8. **S. acutus** Muhl. [Hel]

Marly ponds (Bic; Tng.); swampy ground (Nou.); salt marsh (Bic; Bnc.; Bon.).

(Boreal-)temperate American: B.C. to Nfld., southw. to Calif., Ariz., N. Mex., Tex., Okla., Tenn., and N.C.

9. **S. paludosus** Nels., var. **atlanticus** Fernald, Rhod. 45: 291. 1943. [Hel] (*S. campestris,* var. *paludosus* of Gray's Man., ed. 7.)

Halophyte: salt marshes and tidal flats (Bic; Rim.; Cap.; Val.; Bnc.; Gpe.; Drt.; Pas.; Mar.; Car.).

Temperate eastern American (maritime): e. Que., southw. to N.Y. and N.J.; *S. paludosus* is the plant of western N.A., extending eastward to Manitoba.

10. **S. rubrotinctus** Fernald. [Hel-Hs]

Swampy ground (Bic; Mét.; Mtn.; Gpe.; Manche d'Epée.; Yrk.; Bon.; Nou., Mat.); subalpine lake (Lac Ste. Anne, Tbl.); subalpine meadows (Tbl.; Log.). General in its habitat.

Boreal eastern American: Man. to s. Lab. and Nfld., southw. to Minn., N.Y., and Conn.; closely related to *S. microcarpus* Presl.

11. **S. atrovirens** Willd., var. **georgianus** (Harper) Fernald. [Hsr] (*See* Fernald, Rhodora, 23: 134. 1921; Beetle, Rhod. 46: 336. 1944.)

Wet places (Rim.; Mét.; Nou.).

(Boreal-) temperate American: Mich to Nfld., southw. to Ark. and Ga.

12. **S. cyperinus** (L.) Kunth, var. **pelius** Fernald. [Hsr]

Wet meadow (St. Alphonse de Caplan).

(Boreal-) temperate eastern American: Minn. to Nfld., southw. to Wis., Ind., N.Y., and Conn.

Forma *condensatus* (Fernald) Blake, with short rays, the glomerules crowded in dense irregular masses, is the plant represented in the above collection.

13. **S. atrocinctus** Fernald. [Hsr]

Swampy ground (Bic; Rim.; R. Blanche; Lou.; Bon.; Nou.; Mat.); cedar swamps (New Richmond; Car.).

Boreal American: Sask., Hudson Bay, s. Lab., and Nfld., southw. to Iowa, Mich., Pa., and Conn.

Forma *brachypodus* (Fern.) Blake, with spikelets on shortened pedicels, in dense irregular clusters, has been collected at several localities (Bic; R. Blanche; Dou.; Log.).

14. **S. pedicellatus** Fernald. [Hsr]

Alluvial thickets (PCa.; Nou.); cedar swamp (New Richmond).

Temperate eastern American: Wis. to e. Que., southw. to Ind., N.Y., and Conn.

6. ERIOPHORUM L.

(Cotton Grass)

a. Spikelet solitary.
  b. Involucre none; scales lead-colour, with broad whitish margins, the lowest enlarged and thickened; stem-leaves reduced to mostly bladeless sheaths.
    c. Stoloniferous; culm solitary; empty scales at base of spikelet 7 or less.
      d. Bristles reddish or cinnamon-colour............................1. *E. russeolum*
      d. Bristles white..............................1a. *E. russeolum* var. *lencothrix*
    c. Non-stoloniferous; culms tufted; empty scales 10-15; bristles white; upper sheaths distinctly inflated..2. *E. spissum*
  b. Involucre present, consisting of one leafy bract; scales pale, stramineous.......... ....4a. *E. tenellum.* var. *monticola*

a. Spikelets 2-several; involucre of 1-several leafy bracts.
  b. Leaves very slender, 1-1·5 mm. broad, triangular-channelled throughout; involucre a single erect short bract.
    c. Upper cauline blade with the sheath longer than the blade, smooth, round-tipped; involucre dark at base; scales lead-colour or blackish; achenes 1·5-2 mm. long...3. *E. gracile*
    c. Upper cauline leaf with the sheath shorter than the blade, scabrous, pointed; involucre brown or straw-colour at base; scales greenish straw-colour to reddish brown; achenes 2·5-3 mm. long...............................4. *E. tenellum*
  b. Leaves broader, flat at least below the middle; involucral bracts 2 or more.
    c. Spikelets numerous in a dense head; bristles copper-colour or brown at maturity; scales with several prominent ribs, greenish or stramineous, with a thin nerveless red-brown margin; achene linear-oblong; stamen 1........5. *E. virginicum*
    c. Spikelets umbelled; bristles whitish; scales with only 1 prominent rib; achene obovoid; stamens 3.
      d. Midrib of scale prominent only below the membranous tip; scales lead-colour to castaneous; leaves 1·5-4 mm. broad; upper leaf-sheaths dark-girdled at summit...6. *E. angustifolium*
      d. Midrib prominent to tip of scale; scales greenish drab to lead-colour; leaves 2-6 mm. broad; leaf-sheaths not dark-girdled...........7. *E. viridicarinatum*

1. **E. russeolum** Fries. [Hel] (*E. Chamissonis* of Gray's Man., ed. 7.)

Alpine bogs (Alb.; Tbl.).

Arctic circumpolar, alpine: Aleutian Is., Alaska, Yukon, n. Hudson Bay, Baffin, Lab., and Nfld., southw. to Oreg., Wyo., Ont., and N.S.; arctic and alpine Eurasia.

1a. **E. russeolum,** var. **leucothrix** (Blomgr.) Hultén. (*E. Chamissonis*, var. *albidum* Fernald, Rhod. 7: 84. 1905.)

Alpine bog (Alb.).

Range of the species but with large gaps in general area.

2. **E. spissum** Fernald. [Hs] (*E. callitrix* Fernald, not Cham.; *E. vaginatum* Torr., not L.)

Heath bogs (Bic; Rim.; Pte. au Père; R. Blanche; Nou.; Sayabec); alpine bog on serpentine tableland (Alb.); alpine meadow (Tbl.).

Arctic American, alpine: Alaska, n. Baffin, Melville, Hudson Bay, n. Lab., and Nfld., southw. to Alb., Wis., Mich., N.Y., and R.I.

3. **E. gracile** Koch. [Grh]

Swampy ground (Cld.; New Carlisle).

Boreal circumpolar: s. Alaska, Mack., Alb., Sask., James Bay, Lab., and Nfld., southw. to Calif., Nebr., Ind., Pa., and N.J.; n. Eurasia.

4. **E. tenellum** Nutt. [Grh]

Bog near river mouth (PCa.); cedar swamp (New Richmond); wet places (Gnd.; Nou.); alpine bog (Tbl.).

Boreal eastern American: Hudson Bay to Nfld., southw. to Ill. and N.J.

4a. **E. tenellum,** var. **monticola** Fernald, Rhod. 10: 47. 1908.

Alpine bog (Tbl.) (type station).

Local endemic, alpine.

5. **E. virginicum** L. [Hsr]

Heath bog (Bic; Nou.).

(Boreal-)temperate American: Man. to Côte Nord and Nfld., southw. to Nebr. and Fla.

6. **E. angustifolium** Roth. [Grh]

Heath bogs (Bic; Rim.; Pcé.; Bon. I.; Dan.; God.; Bon.); alpine bogs (Alb.; Tbl.).

Arctic circumpolar, alpine: Aleutian Is., n. Alaska, Yukon, Coronation Gulf, Victoria I., Banks I., Melville I., Ellesmere, Devon, Baffin, Melville, n. Lab., and Nfld., southw. to Oreg., N. Mex., Ill., and Me.; w., s., and e. Greenland; Iceland; Faeroes; Spitsbergen; arctic and alpine Eurasia.

7. **E. viridicarinatum** (Engelm.) Fernald. [Grh]

Calcicole: cedar swamps (Bic; St. Léandre; Car.); wet spot on Mt. Ste. Anne (Pcé.); swamps (Mal.; Bon. I.; Gnd.; New Carlisle; Nou.; Zén.).

(Boreal-)temperate American: s. Alaska, Yukon, Mack. (Great Slave L.), James Bay, e. Que. and Nfld., southw. to Wyo. and N.J., and in the mts. to Ga.

7. CAREX (Rupp.) L.

(Sedge)

[Mackenzie: North American Flora 18: 1-478. 1931-1935. Mackenzie: North American Cariceae I (plates 1-269) and II (plates 270-539), The New York Botanical Garden, 1940.]

a. Spike solitary.
b. Achenes lenticular; stigmas 2.
c. Spikes androgynous (staminate at apex).
d. Perigynia oblong-obovate, brownish or straw-colour, 3-3·5 mm. long, obscurely striate, short-stipitate; achenes brownish black; stigmas elongate; culms 1-12 cm. high, usually hidden among the leaves; leaves 0·25 mm. wide, resembling the culm; plant very densely caespitose........................1. *C. nardina*
d. Perigynia ovate, pale green, 2-3 mm. long, nerveless, ventrally sessile; achenes yellowish brown; stigmas short; culms 1-3·5 dm. high, usually somewhat longer than the leaves; leaves 0·5 mm. wide or less; plant loosely caespitose..2. *C. capitata*
c. Spikes entirely staminate or pistillate, or very nearly so.
d. Spikes 0·5-2 cm. long, the pistillate without empty scales at base; perigynia 4-12, rather plump, subterete but thin-edged, strongly nerved, short-beaked; culms 0·5-3 dm. high; plant freely long-stoloniferous......17. *C. gynocrates*
d. Spikes 1-3 cm. long, the pistillate with 2-3 empty scales at base; perigynia 20-35, plano-convex, with serrulate thin margins, few-nerved or nerveless on the inner face; beak half as long as the body; culms 1·5-7 dm. high; plant very densely caespitose.....................................18. *C. exilis*
b. Achenes triangular; stigmas 3.
c. Pistillate scales deciduous, inconspicuous; perigynia stipitate, subulate, straw-colour, at maturity deflexed and easily detached; style continuous with the achene and of the same bony texture; leaves 1-1·5 mm. wide, shorter than the culms..95. *C. pauciflora*
c. Pistillate scales persistent; perigynia oblong or oblong-obovoid, not reflexed at maturity; style jointed with the achene.
d. Perigynia rounded and beakless at apex, many-nerved, subalternate, green; culms capillary..40. *C. leptalea*

d. Perigynia not rounded at apex, short-beaked.

e. Spike androgynous; perigynia glabrous, 2-keeled, lightly few-nerved; leaves 1-3 mm. wide, the tips early dried and brown; culms 4-15 cm. high, purplish-tinged at base..52. *C. rupestris*

e. Spike entirely staminate or pistillate, densely cylindrical; perigynia white-pubescent, 2-keeled, nerveless; scales purple, ciliate; culms strict, 1-7 dm. high, the staminate smaller than the pistillate...........49. *C. scirpoidea*

a. Spikes more than 1.

b. Achenes lenticular; stigmas 2 (No. 70, *C. misandroides,* may be sought here).

c. Lateral spikes sessile, short; terminal spike androgynous or gynaecandrous, rarely pistillate; perigynia with a dorsal suture towards apex.

d. Perigynia not whitish-puncticulate.

e. Culms arising singly or few together from long-creeping rootstocks; terminal spike androgynous; spikelets in a globose or ovoid head...3. *C. chordorrhiza*

e. Culms loosely to densely caespitose, the rootstocks not long-creeping; spikes mostly elongated.

f. Spikes androgynous.

g. Spikes 3-8, green, 6-15 flowered, the uppermost aggregated, the lowest usually with a setaceous bract; perigynia lance-ovoid, plano-convex, shining, nerveless, perfectly squarrose, about twice longer than the translucent white scale; culm slender and weak...........4. *C. rosea*

g. Spikes numerous, yellowish or tawny when mature.

h. Culms weakly cellular and flattened in drying, 4-6 mm. thick at base, very sharply 3-angled; lowest bract bristle-form, often wanting...8. *C. stipata*

h. Culms not weakly cellular and not flattened in drying, stiff.

i. Perigynia plano-convex, yellowish; bracts much exceeding the spikes; scales pale, mostly long-awned; scarious part of the sheath transversely rugose, white.......................5. *C. vulpinoidea*

i. Perigynia thick-plano-convex or unequally biconvex, brownish; bracts, or all but the lowermost, shorter than the spikes; scales usually fuscous; scarious part of sheath not rugose, red-dotted ventrally..............................Section 6. *PANICULATAE*

f. Spikes not androgynous, the upper gynaecandrous, the lateral gynaecandrous or pistillate.

g. Perigynia at most thin-edged, the lower part of the body spongy-thickened.

h. Perigynia marginless, appressed.........Section 11. *DEWEYANAE*

h. Perigynia thin-edged, spreading or ascending at maturity...Section 10. *STELLULATAE*

g. Perigynia thin, narrowly to broadly wing-margined, the lower part of the body not spongy-thickened.................Section 12. *OVALES*

d. Perigynia whitish-puncticulate; upper spikes gynaecandrous except in *C. disperma;* perigynia not wing-margined, spongy-thickened at base; culms in stools, but rootstocks often slender and prolonged...Section 8. *HELEONASTES*

c. Lateral spikes peduncled, or, if sessile, elongate; terminal spike staminate, or, if otherwise, the lateral spikes peduncled.

d. Achenes continuous with style; perigynia lustrous..Section 40. *VESICARIAE*

d. Achenes jointed with style; perigynia not lustrous.

e. Lowest bract long-sheathing; pistillate spike few- to several-flowered; perigynia pulverulent or golden-yellow at maturity...Section 20. *BICOLORES*

e. Lowest bract sheathless or sometimes short-sheathing; pistillate spikes usually many-flowered; perigynia not as above.

f. Achenes constricted in the middle; scales sharp-pointed to long-awned, 3-nerved..............................Section 35. *CRYPTOCARPAE*

f. Achenes not constricted in the middle; spikes erect to drooping, if nodding the scales not long-awned..................Section 34. *ACUTAE*

b. Achenes triangular; stigmas 3; lateral spikes usually peduncled.

c. Perigynia pubescent, puberulent or roughened.

d. Achenes with sides convex above, closely enveloped in upper part of perigynium-body; bracts of non-basal pistillate spikes sheathless or very nearly so..Section 15. *MONTANAE*

d. Achenes with flat or concave sides.

e. Bracts of non-basal pistillate spikes sheathing, the blades absent or rudimentary, the sheaths more or less purplish-tinged..Section 17. *DIGITATAE*

e. Bracts sheathing or sheathless, the blades well developed.

Leaves not septate-nodulose; perigynia elliptic-oblong, plump, very obtuse, lustrous, many-nerved; terminal spike linear, wholly staminate...71. *C. pallescens*, var. *neogaea*

Leaves septate-nodulose; perigynia beaked, the beak strongly bidentate; style slender..Section 30. *HIRTAE*

e. Bracts, at least the lower ones, long-sheathing.

Perigynia with beak strongly bidentate; scales not strongly dark-tinged...Section 30. *HIRTAE*

Perigynia with beak not strongly bidentate; achenes lenticular; stigmas 2; scales purplish black, with narrow white-hyaline apex; Lac Pleureuse...70. *C. misandroides*

c. Perigynia glabrous.

d. Style articulated with the achene, not indurated, at length deciduous.

e. Scales very broad and leaf-like, entirely enveloping the spike, many-nerved, long-tapering, the lower about 3-4 cm. long; achenes rounded and minutely bossed at apex, constricted at base into a thick stipe; leaves 3-5 mm. broad, stiff, very abundant and overtopping the very unequal culms...41. *C. Backii*

e. Scales not leaf-like; achenes more or less strongly apiculate-tipped, not constricted at base.

f. Lower bracts (at least) long-sheathing.

g. Bracts bladeless or with rudimentary blades; culms capillary, wiry, tufted, 1-4 dm. high; staminate spike overtopped by the 2 upper pistillate spikes; perigynia 1·5-2 mm. long, black and shining at maturity; scales white and thin, obtuse, shorter than the perigynia..53. *C. eburnea*

g. Bracts with well-developed blades.

h. Perigynia with beak bidentate, usually shallowly so...Section 27. *EXTENSAE*

h. Perigynia with beak not bidentate, at most emarginate.

i. Pistillate spikes short, oblong to linear, erect.

j. Perigynia rounded at base, suborbicular in cross-section; achenes loosely enveloped...................Section 23. *GRANULARES*

j. Perigynia tapering at base, triangular; achenes closely enveloped.

Rootstocks elongate, often sending out long horizontal stolons...Section 21. *PANICEAE*

Rootstocks not elongate.............Section 22. *LAXIFLORAE*

i. Pistillate spikes elongate, linear to cylindric, slender-peduncled, the lower drooping.

j. Perigynia beakless, ovoid, obtuse, twice longer than the very obtuse white scales; terminal spike gynaecandrous; leaves broad, very dark.....................................62. *C. gracillima*

j. Perigynia strongly beaked.

Culms strongly reddish-tinged at base, aphyllopodic.......................................Section 25. *SYLVATICAE*

Culms not strongly reddish-tinged at base, phyllopodic.......................................Section 26. *CAPILLARES*

f. Lower bracts sheathless or very short-sheathing.

g. Roots closely clothed with a yellowish felt; perigynia glaucous-green or straw-colour; terminal spike staminate...........Section 32. *LIMOSAE*

g. Roots not clothed with a yellowish felt.

Terminal spike staminate; perigynia dull green, strongly scabrous-papil-

late, prominently few-nerved..........................75. *C. scabrata*
Terminal spike gynaecandrous; perigynia dark-tinged to glaucous-green ....Section 33. *ATRATAE*

d. Style continuous with the achene and of the same bony texture, not withering; leaves septate-nodulose; perigynia strongly nerved or ribbed.
e. Perigynia coriaceous and firm, strongly nerved, the beak short and thick; leaves rough, much longer than the sharply angled stout culms...100. *C. lacustris*
e. Perigynia membranaceous.
f. Perigynia lance-subulate, not inflated, tapering into the beak, many-nerved; spikes suborbicular, closely 5-20-flowered, the perigynia widely spreading and readily disarticulating at maturity; leaves narrow and firm...96. *C. Michauxiana*
f. Perigynia broader, abruptly contracted into the beak.
g. Perigynia finely and closely ribbed, 3·5-7 mm. long..Section 38. *PSEUDO-CYPEREAE*
g. Perigynia coarsely ribbed (nerveless in *C. saxatilis*, var. *miliaris*).
h. Perigynia less than 1 cm. long..............Section 40. *VESICARIAE*
h. Perigynia lanceolate, 1·2-1·7 mm. long, thin, spreading; pistillate spikes 1-3, subglobose, loosely 1-12-flowered; leaves and bracts 3-8 mm. wide, soft, much elongate, dark green...106. C. *intumescens*, var. *Fernaldii*

Section 1. NARDINAE

1. **C. nardina** Fries. [Hr]

Calcicole: alpine schists (Log.).

Arctic circumpolar, alpine: Alaska, Yukon, Ellesmere, Devon, Baffin, Melville, Hudson Bay, n. Lab., southw. in the mts. to B.C. and Colo., and a single isolated station in Gaspe; w. and ne. Greenland; Iceland; Spitsbergen; arctic and alpine Eurasia.

Section 2. CAPITATAE

2. **C. capitata** L. [Hsr]

Alpine rocks (Tbl.; Mtt.).

Arctic circumpolar, alpine: Aleutian Is., Alaska, Yukon, Mack., Hudson Bay, s. Baffin, n. Lab., and Nfld., southw. in the mts. to Calif., Nev., and Wyo., and Gaspe and N.H. (Mt. Washington); Mex.; S. Am.; Greenland; Iceland; arctic and alpine Eurasia.

Section 3. CHORDORRHIZEAE

3. **C. chordorrhiza** Ehrh. [Hsr]

Swampy ground (Bic; Gnd.).

Arctic circumpolar: Alaska, Mack. (Mack. R. Delta, Great Bear L.), s. Baffin, Keewatin, n. Lab., and Nfld., southw. to B.C., Sask., Iowa, Ill., Pa., and N.Y.; Greenland; Iceland; arctic and alpine Eurasia.

Section 4. BRACTEOSAE

4. **C. rosea** Schkuhr. [Hs]

Woods (Rim.; Yrk.; GCa.; Nou.).

(Boreal-)temperate American: N. Dak. to e. Que. and Nfld., southw. to La. and Ga.

Section 5. MULTIFLORAE

5. **C. vulpinoidea** Michx. [Grh]

Wet places (Bic; Gnd.).

(Boreal-)temperate American: B.C. to Nfld., southw. to Oreg. and Fla.

Section 6. PANICULATAE

- a. Inflorescence dense, erect, appearing bristly from the radiating, bright, dark-coloured, ovoid, 2-2·5 mm. long perigynia; scales short....................6. *C. diandra*
- a. Inflorescence more lax and nodding; perigynia more appressed, more lanceolate, duller brown, 2·5-3·5 mm. long; scales 3 mm. long......................7. *C. prairea*

6. **C. diandra** Schrank. [Hs]

Cedar swamp (Bon.; Car.); dried marl pond (Ste. Adelaide); river gravels (Yrk.); wet places (Bic; Rim.; Pte. au Père; Lou.; Ren.; Gpe.; Dou.; Mal.; Gnd.; PCa.; New Carlisle; Nou.).

Boreal circumpolar: Alaska, Yukon, Mack. (Great Bear L.), Keewatin, Lab., and Nfld., southw. to Wash., Wyo., Colo., Iowa, Ind., and Pa., and in the mts. of Calif.; Iceland; Eurasia; New Zealand.

7. **C. prairea** Dewey. [Hs]

Swampy ground (Ste. Luce; Bon.).

Temperate American: B.C. to e. Que., southw. to Nebr., Iowa, Ind., and N.J.; Iceland.

Section 7. VULPINAE

8. **C. stipata** Muhl. [Hs]

Wet places (Bic; Mét.; Tng.; Ren.; Yrk.; Irn.); alpine clearings (Lac Ste. Anne; Log.). General in its habitat.

Boreal American: s. Alaska to Mingan Is., s. Lab., and Nfld., southw. to Calif., N. Mex., Kans., Mo., Tenn., and N.C.; Japan.

Section 8. HELEONASTES

- a. Spikes androgynous; perigynia unequally biconvex, very plump, finely nerved, the minute beak entire, longer than the white scale, usually at length splitting and exposing the dark achene; spikes 1-3-flowered, scattered on the upper part of the very slender culms..9. *C. disperma*
- a. Spikes (at least the uppermost) gynaecandrous; perigynia plano-convex.
  - b. Lowest bract bristle-form, much prolonged; spikes widely separate, 2-5-flowered; perigynia beaked, finely nerved; culms almost filiform............10. *C. trisperma*
  - b. Lowest bract much shorter or none; spikes several- to many-flowered, the upper approximate.
    - c. Perigynia beakless or nearly so; scales white-hyaline; spikes closely aggregated into an ovoid or suborbicular head; rootstocks loosely caespitose and with slender stolons..11. *C. tenuiflora*
    - c. Perigynia very short-beaked to strongly beaked; scales often darker-tinged; rootstocks more densely or very densely caespitose.
      - d. Perigynia ovate, broadest near the base, the beak inconspicuous, strongly serrulate; spikes closely aggregated into an ovoid-oblong or oblong head; culms very soft; plant pale green..............................12. *C. arcta*
      - d. Perigynia broadest near middle; beak short, smooth or moderately serrulate..GROUP A.

GROUP A

a. Spikes 1-4(-6), closely approximate; scales chestnut- or reddish-tinged.
  b. Lateral spikes gynaecandrous; Shickshock Mts.................... 13. *C. bipartita*
  b. Lateral spikes pistillate; maritime plants.
    c. Perigynia fusiform, tapering into the beak, 2·5-3 mm. long.................... 13a. *C. bipartita*, var. *glareosa*
    c. Perigynia broadly ellipsoid, ovoid or obovoid, 1·3-1·9 mm. long, abruptly beaked.................... 13b. *C. bipartita*, var. *amphigena*

a. Spikes 3-9, the lower at least remote.
  b. Scales light reddish brown, obtuse, slightly enveloping the subcoriaceous conic-rostrate perigynia; spikes ovoid or thick-cylindric; culms smooth.................... 14. *C. Mackenziei*
  b. Scales usually lighter coloured, acutish to cuspidate, not at all enveloping the membranous perigynia; culms rough above.
    c. Perigynia loosely spreading, distinctly beaked, the beak bidentate; spikes few-flowered; lowermost bract setaceous-prolonged; leaf-blades 1-2·5 mm. wide, not glaucous.
      d. Plant stiff and low; spikes brownish, ellipsoid, subapproximate.................... 15. *C. brunnescens*
      d. Plant lax; spikes greenish, ovoid, remote.................... 15a. *C. brunnescens*, var. *sphaerostachya*
    c. Perigynia appressed-ascending, the tip short-pointed, entire; leaf-blades 2-4 mm. wide, glaucous.
      d. Spikes approximate or slightly remote.
        e. Spikes short-cylindric to narrowly obovoid; perigynia 2·3-3 mm. long; culms 1·5-6 dm. high.................... 16. *C. canescens*
        e. Spikes short-oblong or subglobose; perigynia barely 2 mm. long; plant smaller.................... 16a. *C. canescens*, var. *subloliacea*
      d. Spikes ellipsoid to cylindric, all but the terminal remote; perigynia 2·3-3 mm. long; inflorescence elongated, flexuous; culms lax, 3-8 dm. high.................... 16b. *C. canescens*, var. *disjuncta*

9. **C. disperma** Dewey. [Grh(-Hel)] (*C. tenella* Schkuhr.)

Swamps and damp woods (Bic; Rim.; Mét.; Mad.; Yrk.; Bon. I.; Car.; Zén.; Lac Humqui). General in its habitat.

Boreal circumpolar: Alaska, Yukon, Mack. (Mack. R. Delta, Great Bear L.), James Bay, Lab., and Nfld., southw. to Calif., N. Mex., Ind., and N.J.; arctic Eurasia.

10. **C. trisperma** Dewey. [Grh(-Hel)]

Swamps and damp woods (Lac à Foin; Val.; Ros.; For.; Dou.; Mal.; Nou.); cedar swamp (Esc.); subalpine woods (Alb.; Tbl.; Lac Ste. Anne). General.

Boreal American: Sask. to s. Lab. and Nfld., southw. to Minn., Ill., and Md.

11. **C. tenuiflora** Wahl. [Hsr]

Swampy ground (New Richmond).

Boreal circumpolar: s. Alaska, Yukon, Mack. (Mack. R. Delta, Great Bear L.), Hudson Bay, n. Que., middle coast of Lab., and Nfld., southw. to Vancouver I., Alb., Sask., Man., Minn., n. shore of Lake Superior, N.Y., and Mass.; n. Eurasia.

12. **C. arcta** Boott. [Hs]

Damp shores (Rim.); woods (Cld.).

Temperate American: B.C., Yukon, n. Alb., Ont., and e. Que., southw. to Calif., Mont., Minn., Mich., and N.Y.

13. **C. bipartita** All. [Hr] (*C. lagopina* Wahl.; *C. Lachenalii* Schkuhr.)

Calcicole: alpine schists (Alb.; Tbl.; McNab).

Alpine serpentine crevices (Alb.).

Arctic circumpolar, alpine: Alaska, Yukon, Mack., Ellesmere, Baffin, n. Hudson Bay, n. Lab., and Nfld., southw. in the mts. to Mont. and Gaspe; w. and e. Greenland; Iceland; Spitsbergen; arctic and alpine Eurasia. Reported from New Zealand.

13a. **C. bipartita,** var. **glareosa** (Wahl.) Polunin. (*C. glareosa* Wahl.; *See* Polunin, Dept. of Mines and Resources, Canada, Bull. 92: 114. 1940.)

Halophyte: sea coast (Tng.; Pointe Sèche; Escuminac); salt marshes (Bic; Ann.).

Arctic circumpolar (maritime): Alaska, Keewatin, Bylot I., Baffin, n. Lab., and Nfld., southw. to Que. and N.B.; w. and e. Greenland; Iceland; Spitsbergen; Eurasia.

13b. **C. bipartita,** var. **amphigena** (Fernald) Polunin. (*C. glareosa,* var. *amphigena* Fernald; *C. marina* Dewey.)

Halophyte: salt marsh (Escuminac) (type station).

Psammophilous halophyte: gravel beaches (Bic; Trl.; Tng.; Nou.).

Arctic circumpolar (maritime): Alaska, Yukon, Mack., Devon, Baffin, Hudson Bay, n. Lab., southw. to Gaspe Peninsula; Eurasia.

14. **C. Mackenziei** Krecz. [Hsr] (*C. norvegica* Willd.)

Halophyte: salt marshes and sea ledges washed by spray (Bic; Mtn.; Gro.; Tng.; Ros.; Drt.; Yrk.; Bnc.; Bon.; Esc.).

(Arctic-)boreal circumpolar (maritime): Alaska, Mack. (Mack. R. Delta), Keewatin, Hudson Bay, n. Lab., and Nfld., southw. to Me. and N.B.; sw. Greenland; Iceland; arctic Eurasia.

15. **C. brunnescens** (Pers.) Poir. [Hs]

Alpine woods (Alb.; Tbl.; Log.; Mtt.; Ftn.; Bln.).

(Arctic-)boreal circumpolar, alpine: Alaska, Mack. (Mack. R. Delta, Great Bear L.), Hudson Bay, n. Lab., and Nfld., southw. to Oreg., Utah, Colo., Minn., Wis., Ohio, and N.H., and in the mts. to Tenn. and N.C. (in the southern part of the area chiefly the following variety); w. and e. Greenland; Iceland; Eurasia.

15a. **C. brunnescens,** var. **sphaerostachya** (Tuck.) Kukenth.

Woods and thickets (Bic; Rim.: Fla.; Mét.; Lac à Foin; Ann.; Cld.; Bon. I.; Irn.); subalpine swamps (Alb.; Tbl.).

Temperate circumpolar: more southern than the species.

16. **C. canescens** L. [Hs]

Moist ground (Ste. Luce; Mét.; Ann.; Lac à Claude; St. Majorique; Cap aux Os; Bon.); alpine thickets (Alb.; Tbl.; Log.); gravel outwash plain below Mt. Albert (R. du Diable).

(Arctic-)boreal circumpolar: Aleutian Is., Alaska, Yukon, and Mack. to n. Que., n. Lab., and Nfld., southw. to Ohio and Conn.; S. Am.; w. and e. Greenland; Iceland; arctic Eurasia; Australia.

16a. **C. canescens,** var. **subloliacea** Laestad.

Wet places (Bic; Lou.; Ren.; For.); alpine meadows (Alb.; Tbl.).
Range of the species.

16b. **C. canescens,** var. **disjuncta** Fernald.

Wet places (Bic; Ste. Luce; Drt.; Dou.; Bnc.).
Boreal eastern American: Wis. to Lab. and Nfld., southw. to Ind., Ohio, and Pa.

Section 9. DIOICAE

17. **C. gynocrates** Wormsk. [Grh]

Calcicole: cedar swamp (Bic; Mét.; Gnd.; Bon.; New Richmond; Car.).

Arctic American: Aleutian Is., Alaska, Yukon, Mack., Keewatin, s. Baffin, n. Lab., and Nfld., southw. to B.C., Colo., Mich., Pa., and N.Y.; w. and e. Greenland; e. Asia (Siberia).

Section 10. STELLULATAE

- a. Spike solitary...18. *C. exilis*
- a. Spikes more than 1.
  - b. Perigynia small, 2·25-3·25 mm. long, the beak very shallowly bidentate one-fourth to one-third length of the body.
    - c. Perigynia nerveless or few-nerved at the base ventrally, brownish or tawny, the beak with ventral false suture inconspicuous; scales obtuse; anthers 1 mm. or less long; leaf blades 1-3 mm. wide..............................19. *C. interior*
    - c. Perigynia strongly nerved ventrally, deep green, the beak with ventral false suture conspicuous; scales subacute; anthers 1-1·5 mm. long; leaf blades 0·5-1 mm. wide...20. *C. Howei*
  - b. Perigynia 2·75-4·75 mm. long, the ventral suture conspicuous; beak sharply bidentate.
    - c. Staminate flowers terminal, basal, or in separate spikes; beak setulose-serrulate; spikes 3-6, subglobose, olive-green, densely flowered, subcontiguous; scales chestnut brown..21. *C. sterilis*
    - c. Staminate flowers mostly at base of terminal spike; beak serrulate or not.
      - d. Pistillate scales obtusish, chestnut-brown with lighter 3-nerved green centre and shining white-hyaline margins and apex, not sharply keeled, the midvein obscure at apex..22. *C. echinata*
      - d. Pistillate scales acute to short-cuspidate, yellowish brown, the margins and apex narrow, opaque or hyaline, the midvein sharply defined, prominent to apex.
        - e. Perigynia lanceolate, nerveless, the beak about the length of the body, sparingly serrulate; leaves 0·75-1·75 mm. wide............23. *C. angustior*
        - e. Perigynia ovoid, strongly nerved, the beak about half the length of the body, strongly serrulate; leaves 1·5-2·5 mm. wide......24. *C. cephalantha*

18. **C. exilis** Dewey. [Hs]

Sphagnum swamp (Bic; Gnd.).

Boreal eastern American: James Bay to Lab. and Nfld., southw. to Minn. and Del.

19. **C. interior** Bailey. [Hs]

Swampy meadows and wet places (Bic; Mét.; Mtn.; Ann.; Cld.; Lou.; Mad.; For.; Pcé.; Bon. I.; Gnd.; New Carlisle; Bon.; Car.; Mat.; Zén.).

Boreal American: B.C., Hudson Bay, Lab., and Nfld., southw. to Calif., Ind., and Pa.; Mexico.

20. **C. Howei** Mack. [Hs]

Moist cliffs (Prr.).

Temperate eastern American: Mich. to e. Que., southw. to Ind., La., and Fla.

21. **C. sterilis** Willd. [Hs] (*C. scirpoides* Schkuhr.)

Swampy meadow (Ann.).

(Boreal-)temperate eastern American: Minn. to s. Lab. and Nfld., southw. to Pa. and N.J.

22. **C. echinata** Murr. [Hs] (*C. stellulata* Good.)

Swampy soil (Gpe.; Anse à Vallon); calcareous alpine meadow (Tbl.); alpine meadow (Log.).

Boreal circumpolar: Aleutian Is., s. Alaska to Lab. and Nfld., southw. to Alb. and Que.; Greenland; Iceland; Faeroes; n. Eurasia.

23. **C. angustior** Mack. [Hs]

Swampy meadows (Bic; Rim.; Mét.; Gpe.); woods (Cld.; Lou.); swampy beaches (R. Cap Chat); alpine serpentine barrens (Alb.); edge of alpine stream (Alb.).

(Arctic-)boreal American: Wash. to James Bay, n. Lab., and Nfld., southw. to Calif., N.C., and D.C.

24. **C. cephalantha** (Bailey) Bicknell. [Hs]

Swampy meadows (Rim.; Mtn.; Anse à Vallon).

(Boreal-)temperate American: B.C. to Nfld., southw. to Wash. and Md.

Section 11. DEWEYANAE

a. Perigynia narrowly lanceolate, strongly few-nerved; scales oblong, pointed, brownish with green centre; leaves 1-2·5 mm. broad........................25. *C. bromoides*
a. Perigynia oblong-lanceolate, nearly nerveless; scales ovate, acuminate or short-cuspidate, whitish with green centre; leaves 2-5 mm. broad.
  b. Lowermost spike long-bracted, the internode between it and the one above being 1-3 cm. long; terminal cluster of 2-6 spikes nodding...........26. *C. Deweyana*
  b. Lowermost spike subtended by a short or nearly obsolete bract; spikes often 12 mm. long, all approximate or overlapping....26a. *C. Deweyana*, var. *collectanea*

25. **C. bromoides** Schkuhr. [Hs]

Rich woods (Rim.).

Temperate eastern American: Wis. to e. Que., southw. to La. and Fla.

26. C. Deweyana Schwein. [Hs]

Woods (Ann.; Val.; Mad.; Pcé.; PCa.; GCa.; Car.; Irn.; Zén.); subalpine woods (Alb.).

Boreal American: B.C., Mack., James Bay, Lab., and Nfld., southw. to Ariz. and Pa.

26a. C. Deweyana, var. **collectanea** Fernald, Rhod. 15: 93. 1913.

Woods (Ann.; Gnd.; GCa. (type station)); subalpine meadows and woods (Alb.; Tbl.; Col.).

Gaspe endemic.

Section 12. OVALES

- a. Scales about equalling the perigynia and about the same width above.
  - b. Beak of the perigynia slender, terete, serrulate, shallowy bidentate, one-third to one-half the length of the body, obliquely cut dorsally; scales reddish brown with green centre and conspicuous broad silvery-white-hyaline margins.................. 27. *C. praticola*
  - b. Beak of the perigynia flattened and serrulate to the tip, bidentate.
    - c. Inflorescence stiff; spikes approximate, the lateral ones suborbicular; lowermost bract broadly dilated and nerved at base, cuspidate-prolonged, the second much shorter, the upper scale-like, light reddish brown; achene 1·8-2·1 mm. broad.................. 28. *C. adusta*
    - c. Inflorescence flexuous-moniliform, not stiff; spikes oblong or oblong-obovoid, clavate at base; bracts all scale-like, dull brown or reddish brown; achene 1·3-1·7 mm. broad.................. 29. *C. aenea*
- a. Scales shorter than perigynia and noticeably narrower above.
  - b. Beak of perigynia slender, terete, bidentate, the tip not serrulate, obliquely cut dorsally; perigynia much flattened, thin and scale-like, membranous.................. 30. *C. macloviana*
  - b. Beak of the perigynia flattened and serrulate to the tip, bidentate.
    - c. Leaf-blades of sterile culms widely spreading, numerous, not clustered at apex; sterile culms strongly developed; sheaths loose; perigynium-wing somewhat abruptly narrowed near middle of body.
      - d. Tips of perigynia loosely ascending to recurved; spikes suborbicular, not turbinate, 4-8 mm. long; leaf-blades flaccid; culms not stiff....31. *C. projecta*
      - d. Tips of perigynia appressed or ascending; spikes suborbicular-turbinate to obovoid-turbinate, 5-12 mm. long; leaf-blades firm; culms stiff.................. 32. *C. tribuloides*
    - c. Leaf-blades of sterile culms erect or ascending, usually clustered at apex; sterile culms often poorly developed.
      - d. Perigynium-body obovate, widest near the top, short-beaked, broad-winged, 3-5-nerved on the inner, 6-12-nerved on the outer, face; spikes remote, clavate at base, whitish; leaves erectish, usually glaucous................33. *C. silicea*
      - d. Perigynium-body not obovate, widest near the middle or base.
        - e. Leaf-sheath green-striate ventrally nearly to mouth; inflorescence moniliform, of 3-9 broadly ovoid brownish spikes; perigynia distinctly about 10-nerved on each face; scales lance-attenuate or aristate..34. *C. hormathodes*
        - e. Leaf sheaths strongly white-hyaline ventrally.
          - f. Perigynia subulate to narrowly ovate-lanceolate, 3-4 times as long as wide, thin and scale-like except where distended by achene.
            - g. Perigynia lanceolate-subulate, where distended by achene 0·8-1·5 mm. wide, the margin at base nearly obsolete.

              Slender, 1-3 dm. high; leaves 1-2·5 mm. wide; spike dull brown, the spikelets 3-7 mm. long, approximate................35. *C. Crawfordii*

              Stouter throughout; culms 3-6 dm. high; leaves 2·5-3 mm. broad; spikelets mostly greener, 8-11 mm. long, densely crowded in a broad-ovoid to globose head....................35a. *C. Crawfordii*, var. *vigens*

g. Perigynia lanceolate to narrowly ovate-lanceolate, 1·2-2 mm. wide, noticeably wing-margined to the base..................36. *C. scoparia*

f. Perigynia ovate, at most twice as long as wide.

g. Perigynia 3-3·5 mm. long, brownish at maturity (dull green when young); spikes closely aggregated, truncate or rounded at base; inflorescence short, compact, ovoid to ellipsoid...............37. *C. Bebbii*

g. Perigynia 3·5-4 mm. long, straw-coloured at maturity (green when young).

Spikes usually forming a moniliform flexuous infloresence; scales greenish hyaline or tawny-tinged..........................38. *C. tenera*

Spikes closely aggregated; scales light reddish brown........39. *C. tincta*

27. **C. praticola** Rydb. [Hs] (*C. pratensis* Drejer.)

Calcicole: inland cliffs (Tra.).

Boreal American: s. Alaska, Yukon, Mack., Alb., Sask., Man., e. Lab., southw. to Calif., Colo., N. Dak., Mich., and Que.; w. Greenland.

28. **C. adusta** Boott. [Hs]

River gravels and mud (Ann.); habitat not stated (Bic).

Boreal American: Mack., Sask., Minn., and Nfld., southw. to N.Y.; Greenland.

29. **C. aenea** Fernald. [Hs]

Conifer woods (Bic); sea ridges (Bic; Rim.); cliffs above lake (Lac Pleureuse); sea cliffs (Srl.); inland cliffs (Tra.); river flats (Yrk.; GCa.); dry sands (Pén.; Car.); dry places (Ann.; Nou.); alpine situations (Alb.; Nic.).

(Arctic-) boreal American: Alaska, Yukon, Mack., James Bay, n. Lab., and Nfld., southw. to B.C., Mont., S. Dak., Minn., Mich., and N.Y.

30. **C. macloviana** d'Urv. [Grh] (*C. festiva* Dewey.)

Alpine and subalpine meadows and swamps (Tbl.; McNab); habitat not stated (Pointe Sèche).

(Arctic-)boreal circumpolar, alpine: Alaska, Yukon, Mack. (Mack. R. Delta, Great Bear L.), n. Lab., and Nfld., southw. to Calif., Idaho, and Wyo., and Gaspe; S. Am.; Greenland; Iceland; n. Eurasia.

31. **C. projecta** Mackenzie. [Hs] (*C. tribuloides*, var. *reducta* Bailey.)

Damp soil (Bic; Rim.; Mét.; Mtn.; Prr.; Yrk.; GCa.; Mat.); alpine situations (Alb.; Log.; Bln.).

Boreal American: B.C. to s. Lab. and Nfld., southw. to Iowa and D.C.

32. **C. tribuloides** Wahl. [Hs]

Wet meadows (Grand Lac Matane; GCa.).

Temperate eastern American: Minn. to e. Que., southw. to La. and Fla.

33. **C. silicea** Olney. [Hs]

Sandy beach (Anse au Griffon; Jhn.; Dou.).

(Boreal-)temperate eastern American (maritime): Iowa to Nfld., southw. to Del.

34. **C. hormathodes** Fernald. [Hs]

Halophyte: brackish meadows and salt marshes (Bic; Mtn.; Anse au Griffon; Gpe.; Drt.; Mal.; Bon.; PCa.; Mar.).

(Boreal-)temperate eastern American (maritime): Que. to Nfld., southw. to Va.

35. **C. Crawfordii** Fernald. [Hs]

Woods and moist places (Bic; Mét.; R. Blanche; Ren.; Gpe.; Yrk.; Nou.; Irn.).

(Boreal-)temperate American: Alaska, Mack., s. Hudson Bay to Nfld., southw. to Wash., Idaho, Minn., Wis., Mich., and N.Y.

35a. **C. Crawfordii,** var. **vigens** Fernald.

Moist soil (Gpe.).

Probably range of the species.

36. **C. scoparia** Schkuhr. [Hs]

Wet places (Rim.).

(Boreal-)temperate American: B.C. to Nfld., southw. to Oreg., N. Mex., and S.C.

37. **C. Bebbii** Olney. [Hs]

Swampy meadows and river banks (Bic; Pte. au Père; R. Blanche; Mtn.; Cap Chat; Yrk.; New Carlisle; New Richmond; Car.; Nou.).

(Boreal-)temperate American: Mack. to Mingan Is. and Nfld., southw. to Wash., Colo., Ill., and N.J.

38. **C. tenera** Dewey. [Hs] (*C. straminea* of Gray's Man., ed. 7.)

Clearings and bushy swales (Bic; Ann.).

Temperate American: Alb. to e. Que., southw. to Ill., N.C., and D.C.

39. **C. tincta** Fernald, Rhod. 15: 186. 1913. [Hs]

Flats near river mouth (Manche d'Epée).

(Boreal-)temperate American: Alb. to Nfld., southw. to Mich. and Conn.

Section 13. Polytrichoideae

40. **C. leptalea** Wahl. [Hsr]

Wet places (Bic; Rim.; Baie des Sables; Grand Lac Matane; R. Blanche; Mad.; Ren.; Ros.; Yrk.; Gnd.; GCa.); subalpine meadow (Log.). General in its habitat.

Boreal American: Alaska, Yukon, Mack. (Great Bear L.), Hudson Bay, Lab., and Nfld., southw. to Calif., Colo., Tex., La., and Fla.

Section 14. Phyllostachyae

41. **C. Backii** Boott. [Hs] (*C. durifolia* Bailey.)

Calcicole: dry slaty river banks (Cap Chat); dry crests of sea cliffs (Bic); inland cliffs (Tra.).

Temperate American: B.C. to e. Que., southw. to Nebr. and N.Y.

Section 15. Montanae

a. Staminate and pistillate spikes at most moderately separate.
  b. Perigynium-body oblong-obovoid, much longer than broad.
    c. Scales suborbicular, obtusish to short-mucronate, much shorter than the hirsute-pubescent perigynium-body; staminate spike exceeded by the pistillate ones. . . . .42. *C. Peckii*

c. Scales ovate-lanceolate, acuminate or cuspidate, equalling or exceeding the puberulent perigynium-body; staminate spike very narrow, 4-16 mm. long, 0·5-1 mm. wide .... 43. *C. novae-angliae*

b. Perigynium-body suborbicular, as broad as long.

c. Plants loosely caespitose and without long horizontal stolons; ligule conspicuous, longer than wide; culms mostly without leaves at the base, not conspicuously fibrillose at base .... 44. *C. communis*

c. Plants densely caespitose, with long horizontal stolons; ligule short, wider than long; culms leafy at base; perigynium-beak about half as long as the body.... .... 45. *C. pensylvanica*, var. *distans*

a. Lower pistillate spikes widely separate on elongate subradical peduncles.

b. Bract of lowest non-basal pistillate spike leaflet-like, exceeding the setaceous culm; rootstock slender; staminate spike 2-5 mm. long, inconspicuous............ .... 46. *C. deflexa*

b. Bract of lowest non-basal pistillate spike scale-like and generally shorter than the culm; plants caespitose, forming dense mats.

c. Perigynia membranous, 2·25-3·25 mm. long, the body short-pubescent above; leaf-blades thin but firm, light green, erect, 1·5-3 mm. broad.................. .... 47. *C. umbellata*, var. *brevirostris*

c. Perigynia subcoriaceous, 3·5-4·5 mm. long, the body glabrous or very sparsely short-pubescent above; leaf-blades thick, stiff, deep green, spreading at maturity, 2-4·5 mm. wide .... 48. *C. tonsa*

42. **C. Peckii** Howe. [Hsr] (*C. clivicola* Fern. & Weath.)

Calcicole: sea cliffs (Bic; Ann.; Trl.; Prr.; Pcé.); thickets (R. Cap Chat); alluvial woods (GCa.).

Boreal American: Alaska, Yukon, James Bay, e. Que., southw. to B.C., S. Dak., Wis., and N.J.

43. **C. novae-angliae** Schwein. [Hsr]

"Rocky points, Gaspe coast", according to Macoun, Catalogue of Canadian Plants, part 4: 160. 1888; alpine schists (Bln.); habitat not stated (Rim.; Car.).

(Boreal-) temperate eastern American: Wis. to Nfld., southw. to Pa. and Conn.

44. **C. communis** L. [Hs]

Calcicole: slaty ridges (Bic); river ledges and gravels (Cap Chat; Yrk.); dry ground (Rim.; Ann.; Tra.; Dou.; GCa.; Nou.).

Temperate American: B.C. to e. Que., southw. to Ark. and Ga.

45. **C. pensylvanica** Lam., var. **distans** Peck. [Grh] (*C. lucorum* Willd.; *C. pensylvanica*, var. *lucorum* (Willd.) Fernald.)

River ledges (Ann.).

Temperate eastern American: Wis. to e. Que., southw. to N.C.

46. **C. deflexa** Hornem. [Hsr]

Dry ground (Rim.; Gpe.; Pcé.; Bon. I.; GCa.; Nou.); sand dunes (Pén.); dry slaty bank (R. Cap Chat); river banks (Ann.; Bon.); alpine meadow (Tbl.); alpine thickets (Tbl.; Log.; Mtt.; Ftn.; Nic.).

Alpine serpentine barrens (Alb.); gravel outwash plain below Mt. Albert (R. du Diable).

Boreal American, alpine: Alaska, Yukon, Mack. (Great Bear L.), Keewatin, Lab., and Nfld., southw. to B.C. and N.Y.; s. Greenland.

47. **C. umbellata** Schkuhr, var. **brevirostis** Boott. [Hsr]

Dry slaty ridges (Bic); dry ground (Cap Chat; PCa.; GCa.).

Boreal American: B.C. to Keewatin and Nfld., southw. to Ill. and Md.

48. **C. tonsa** (Fernald) Bicknell. [Hsr] (*C. umbellata*, var. *tonsa* Fernald.)

Sand dunes (Pén.); slaty ridges (Bic).

Boreal American: Mack. to e. Que., southw. to Ind. and D.C.

Section 16. SCIRPINAE

49. **C. scirpoidea** Michx. [Grh]

Calcicole: sea cliffs (Pcé.; Bon. I.); river ledges (Ann.; Drt.; Jhn.; Gnd.; Bon.; Pab.); subalpine cliffs above Lac des Américains (Tbl.); alpine schists (Log.; Ftn.).

Alpine serpentine barrens (Alb.); gravel outwash plain below Mt. Albert (R. du Diable).

Arctic circumpolar, alpine: Alaska, Yukon, Mack., Victoria I., Boothia Pen., Devon, n. Baffin, Melville, Hudson Bay, n. Lab., and Nfld., southw. to Wash., Colo., Mont., Man., and mts. of Me.; w. and e. Greenland; Iceland; rare and local in arctic Eurasia.

Section 17. DIGITATAE

a. Basal leaves 2-5 mm. broad, generally exceeding the culm; staminate spike long-peduncled; basal spikes present; pistillate scales abruptly cuspidate or short-awned, green to purple..50. *C. pedunculata*

a. Leaves about 2 mm. broad, much shorter than the culms; staminate spike sessile or almost; basal spikes absent; perigynia hairy, much exceeding the dark pale-margined roundish scales..51. *C. concinna*

50. **C. pedunculata** Muhl. [Hrr]

Woods (Ann.; Dou.; Gnd.; New Carlisle; Bon.; PCa.; GCa.; Car.; Nou.).

(Boreal-)temperate American: B.C. to Nfld., southw. to S. Dak., Iowa, and Va.

51. **C. concinna** R. Br. [Hrr]

Calcicole: sea cliffs (Bic; Lbn.; Pcé.); inland cliffs (Mt. Commis, St. Donat, Rimouski co.); river banks (Ann.; Gnd.; Bon.; PCa.; GCa.); subalpine cliffs above Lac des Américains (Tbl.).

Boreal American: Alaska, Yukon, Mack. (Mack. R. Delta, Great Bear L.), Hudson Bay (Churchill), Lake Mistassini, Mingan Is., and Nfld., southw. to B.C. and Que.; isolated in Wyo., Colo., and S. Dak.

Section 18. RUPESTRES

52. **C. rupestris** All. [Grh] Rydberg, p. 129.

Calcicole: limestone shelves (Pcé.); alpine schists (Tbl.; Log.; Ftn.; Bln.).

Arctic circumpolar, alpine: Alaska, Yukon (Herschel I.), Mack. (Mack. R. Delta, Great Bear L.), Ellesmere, Baffin, Melville, Hudson Bay, n. Lab., Nfld., southw. in the mts. to the Gaspe Peninsula; Greenland; Iceland; Spitsbergen; arctic and alpine Eurasia.

Section 19. ALBAE

53. **C. eburnea** Boott. [Grh]

Calcicole: sea cliffs (Bic; Rim.; R. Cap Chat; Srl.; Marsouins; Lbn.; Ros.; For.; Pcé.; Bon. I.); inland cliffs (Tra.); river ledges (Ann.; Portage; Ren.; Gnd.; Pab.; Bon.; PCa.; Mat.); gravel beach (Car.).

Boreal American: Alaska, Yukon, Mack. (Mack. R. Delta, Great Bear L.), Hudson Bay to Nfld., southw. to B.C., Alb., S. Dak., Mo., Tenn., and Va.

Section 20. BICOLORES

a. Mature perigynia plump, fleshy, smooth, rounded at tip, golden-orange (drying brownish); spikes loosely few-flowered, 2 or 3 of the bracts exceeding the culm; terminal spike frequently pistillate above............................54. *C. aurea*

a. Mature perigynia dry and firm, white, pulverulent, tapering to the short tip; spikes closely flowered, only the lowermost subtended by an elongated bract; terminal spikes mostly pistillate................................55. *C. Garberi,* var. *bifaria*

54. **C. aurea** Nutt. [Grh]

Calcicole: sea cliffs (Lou.; Anse Jersey; For.; Pcé.; Bon. I.); river gravels (Ann.; Mad.; R. Portage; Mat.); river banks (R. Blanche; Mtn.; Tng.); gravel beach (Bon.); fields (New Carlisle; Esc.; Irn.); cedar swamp (Bic).

Psammophilous halophyte: sea beach (Mét.).

Boreal American: Alaska, Yukon, Mack., Hudson Bay, Lab., and Nfld., southw. to Calif., Utah, N. Mex., Nebr., Ind., Pa., and Conn.

55. **C. Garberi** Fernald, var. **bifaria** Fernald, Rhod. 37: 255. 1935. [Grh]

Calcicole: river gravels (Mtn.; Ann. (type station); Gnd.; Pab.; Bon.; GCa.); edge of stream (Bic). (Some specimens distributed as *C. Hassei* Bailey.)

Disjunct American: Alaska, Yukon, Mack. (Mack. R. Delta, Great Bear L.), southw. to s. B.C. and s. Alb.; Great Lakes region; e. Que. to Me.

Section 21. PANICEAE

a. Perigynia beakless, nerved, granular; leaf-blades and perigynia strongly glaucous; spikes dense, approximate............................56. *C. livida,* var. *Grayana*

a. Perigynia nearly nerveless, tapering into a short-cylindric, thick, excurved beak 1 mm. long; spikes loosely flowered, distant; leaves not glaucous...57. *C. vaginata*

56. **C. livida** (Wahl.) Willd., var. **Grayana** (Dewey) Fernald. [Grh] (*C. livida* of Gray's Man., ed. 7; *See* Fernald in Rhod. 28: 5-8. 1926.)

Calcicole: river gravels (Gnd.); cedar swamp (Bon.).

Boreal circumpolar: Alaska, Mack. (Mack. R. Delta), to Lab. and Nfld., southw. to Wash., Idaho, Minn., Mich., and N.J.; isolated in n. Calif.; Eurasia.

57. **C. vaginata** Tausch. [Grh] (*C. saltuensis* Bailey.)

Woods (Cld.; Bon. I.); cedar swamps (Bic; Bon.; Esc.); swampy ground (Lou.; Tbl.); alpine serpentine tableland (Alb.).

Arctic circumpolar, alpine: Bering I., Alaska, Yukon, Coronation Gulf, s. Baffin, Hudson Bay, n. Lab., and Nfld., southw. to B.C., Sask., Minn., Mich., and N.Y.; Iceland; arctic and alpine Eurasia.

Section 22. LAXIFLORAE

a. Sheath of bracts smooth on edges or shallowly serrulate; beak of perigynium minute; perigynia arranged closely above, loosely and alternately towards the base..58. *C. ormostachya*

a. Sheaths of bracts strongly serrulate on edges; beak of perigynium 0·5 mm. long; perigynia loosely and alternately arranged......................59. *C. leptonervia*

58. **C. ormostachya** Wiegand. [Hs] (*C. laxiflora*, var. *intermedia* Boott.)

Dry soil (Bic) (paratype station).

Temperate eastern American: Minn. to e. Que., southw. to Pa. and Mass.

59. **C. leptonervia** Fernald. [Hs] (*C. laxiflora*, var. *leptonervia* Fernald, Rhod. 8: 184. 1906.)

Dry ground (Bic; Rim.); woods (Mét.; Cap Chat; Ann.; Cld.; Ren.); subalpine woods (Alb.; Tbl.; Log.); subalpine meadow (Mtt.).

Boreal eastern American: Minn. to Lab. and Nfld., southw. to Ohio and N.J., and in the mts. to Tenn. and N.C.; a northern extreme of the species.

Section 23. GRANULARES

a. Staminate spike sessile or nearly so; two upper pistillate spikes usually contiguous; perigynia 2-2·5 mm. long, resinous-puncticulate; some bracts overtopping culms, their sheaths conspicuously prolonged upward at mouth, their ligules much longer than wide; achenes short-apiculate..................60. *C. granularis*, var. *Haleana*

a. Staminate spikes long-peduncled; spikes widely separated; perigynia 3-3·5 mm. long; bracts normally shorter than the culms, the sheaths only little prolonged upward at mouth, their ligules very short; achenes prominently apiculate...61. *C. Crawei*

60. **C. granularis** Muhl., var. **Haleana** (Olney) Porter. [Hsr] (*C. Haleana* Olney.)

River bank (Mat.).

Temperate American: Sask. to e. Que., southw. to Kans., Ind., and Va.

61. **C. Crawei** Dewey. [Grh]

River bank (Mat.); wet field (Pcé.).

Temperate American: Alb. to e. Que., southw. to Wyo., Kans., Tenn., Ala., and N.J.

Section 24. GRACILLIMAE

62. **C. gracillima** Schwein. [Grh]

River gravels and ledges (Drt.; Yrk.; Bon.; GCa.); slaty soil in meadow (Rim.); woods (Bic; Dan.; Nou.; Esc.).

(Boreal-)temperate American: Man. to Nfld., southw. to Mo., Ky., and Va.

Section 25. SYLVATICAE

a. Pistillate spikes narrowly linear or linear, the larger 2·5-8 cm. long; leaf-blades glabrous.
  b. Achenes slenderly stipitate; pistillate scales mostly obtuse; perigynia sessile, 4·5-7 mm. long; leaves 2-4 mm. broad..................63. *C. debilis*, var. *Rudgei*
  b. Achenes truncately substipitate; pistillate scales strongly cuspidate or awned; perigynia strongly stipitate, 3-5 mm. long; leaves 5-10 mm. broad....64. *C. arctata*

a. Pistillate spikes oblong-cylindric, about 6 mm. thick, 0·8-2·5 cm. long; scales brown, acute.
  b. Leaves pubescent..65. *C. castanea*
  b. Leaves glabrous..............................65a. *C. castanea*, var. *Knieskernii*

63. **C. debilis** Michx., var. **Rudgei** Bailey. [Hs] (*C. flexuosa* Muhl.; *See* Fernald, Rhod. 44: 310. 1942.)

Woods (Rim.); slaty soil in meadow (Rim.); meadows (New Carlisle; Car.).

(Boreal-)temperate eastern American: Wis. to Nfld., southw. to Mo. and Tenn.; more northern than the typical form.

64. **C. arctata** Boott. [Hs]

Dry woods (Bic; Mét.; Grand Lac Matane; Ann.; Cld.; Yrk.; Gpe.; Pcé.; Car.; Irn.); moist cliffs (Prr.); subalpine woods (Alb.; Lyl.). General in its habitat.

(Boreal-)temperate eastern American: Minn. to Nfld., southw. to Ohio and Pa.

65. **C. castanea** Wahl. [Hs] (*C. flexilis* Rudge.)

Calcicole: river banks and thickets (Ann.; Cld.; Lou.; Ren.; Drt.; Bon. I.; New Carlisle; Bon.; Irn.; Zén.); cedar swamp (New Carlisle); subalpine woods (Tbl.); calcareous alpine meadow (Tbl.).

(Boreal-)temperate eastern American: Minn. to Nfld., southw. to the Great Lakes region and N.Y.

65a. **C. castanea,** var. **Knieskernii** Mackenzie. (× *C. Knieskernii* Dewey; *C. arctata* × *castanea* Bailey; *See* Rhod. 32: 162-166. 1930.)

Calcicole: river banks (Ann.; Mad.).

Temperate eastern American: Minn. to e. Que., southw. to N.Y.

Section 26. CAPILLARES

a. Culms 0·3-2·5 cm. tall; spikes approximate, the lowest rarely 2 cm. apart.. 66. *C. capillaris*

a. Culms 1·5-8 dm. tall; spikes remote, the lowest 2·5-10 cm. apart.. 66a. *C. capillaris*, var. *elongata*

66. **C. capillaris** L. [Hs]

Calcicole: sea cliffs (Bic; Anse Jersey; Pcé.; Bon. I.); alpine cliffs (Alb.; Tbl.; Log.).

Arctic circumpolar, alpine: Aleutian Is., Alaska, Yukon, Mack., Ellesmere, Baffin, Keewatin, n. Lab., and Nfld., southw. to Nev., Utah, N. Mex., Wis., Mich., N.Y., and mts. of N.H.; Greenland except northernmost part; Faeroes; Iceland; arctic and alpine Eurasia.

66a. **C. capillaris**, var. **elongata** Olney.

Calcicole: sea cliffs (Bic; Gro.; Mét.; Lou.; For.; Pcé.; Bon. I.; New Carlisle; Car.); river ledges (Ann.; Drt.; Gnd.; Pab.; Bon.; PCa.; GCa.; Mat.); calcareous alpine meadow (Tbl.); edge of subalpine lake, Mt. Albert (Lac du Ruisseau du Plaqué-Malade).

Southern part of the range.

Section 27. EXTENSAE

a. Perigynia 2-3·5 mm. long, not at all or only little deflexed, not obliquely attached, the beak markedly shorter than the body; rootstock not at all prolonged.
  b. Sheath of lowest bract convex and prolonged upward at mouth opposite blade, the blade normally strongly divaricate; perigynium-beak about half the length of the body.......................67. *C. serotina*
  b. Sheath of lowest bract concave or truncate and not prolonged upward, the blade normally erect; perigynium-beak about one-third the length of the body.......................68. *C. viridula*

a. Perigynia 3·5-6 mm. long, the lower at least deflexed and obliquely attached, the beak about the length of the body; rootstock very short-prolonged.
  b. Perigynium-beak smooth or very nearly so, whitish; scales not or but very little reddish-tinged, concealed by the perigynia; perigynia 3·5-4·5 mm. long; leaves 1·5-3 mm. wide.......................69c. *C. flava*, var. *fertilis*
  b. Perigynium-beak serrulate, reddish-tinged at tip; scales strongly reddish-tinged, conspicuous in the spike.
    c. Perigynia little inflated, 4-6 mm. long, all obliquely contracted into a beak about as long as the body; staminate spike normally sessile or short-peduncled.
      d. Perigynia ovoid, abruptly beaked.......................69. *C. flava*
      d. Perigynia subulate or conic-subulate, gradually tapering to the beak.......................69a. *C. flava*, var. *gaspensis*
    c. Perigynia markedly inflated, 4 mm. long, abruptly contracted into a longish beak; staminate spike long-peduncled.......................69b. *C. flava*, var. *lepidocarpa*

67. **C. serotina** Mérat. [Hs] (*C. Oederi* of most auth., not Retz.)

Halophyte: salt marsh (Ste. Luce; Bnc.).

Boreal circumpolar: Hudson Bay to Nfld., southw. to Que. and N.S.; s. Greenland; Iceland; Faeroes; Eurasia.

68. **C. viridula** Michx. [Hs] (*C. Oederi*, var. *pumila* (Coss & Germ.) Fernald.)

Calcicole: river gravels (Yrk.; Bon.; Mat.); edge of lake (Lac Matapédia); wet places (Rim.; Manche d'Epée; Mad.).

Halophyte: salt marsh (Bnc.).

Boreal American: Alaska, Yukon, Mack. (Great Bear L.), to Mingan Is. and Nfld., southw. to Calif., Nev., Utah, and N. Mex., and Ill., Ind., and N.J.; s. Greenland; e. Asia.

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69. **C. flava** L. [Hs]

Calcicole: sea cliffs (Pcé.; Bon. I.); river gravels (Mtn.; Mad.; Drt.; Yrk.; Jhn.; Gnd.; Pab.; Bon.; PCa.; Mat.); edge of stream (Bic); wet meadows (Mét.; R. Blanche; Ren.; For.; Bon. I.; New Richmond; Car.); edge of stream below Mt. Albert (Ruisseau du Plaqué-Malade); subalpine meadow (Log.); brookside (Nic.).

Boreal circumpolar: s. Alaska, Hudson Bay, Lab., and Nfld., southw. to Mont., Ind., Pa., and N.J.; Iceland; Faeroes; Europe; e. Asia.

69a. **C. flava,** var. **gaspensis** Fernald, Rhod. 8: 200. 1906.

Calcicole: sea cliffs (Pcé.; Bon. I.); river gravels (Drt.; Gnd.; Bon. (type station); PCa.); wet calcareous marl (Oie).

(Boreal-)temperate eastern American: e. Que. to Nfld., southw. to Vt.

69b. **C. flava,** var. **lepidocarpa** Godr. (*C. lepidocarpa* Tausch.)

River gravels (Gnd.; Bon.); bogs (Ste. Luce; Albertville).

Amphi-Atlantic: e. Que., N.B., N.S., and Nfld.; Europe.

69c. **C. flava,** var. **fertilis** Peck. (*C. cryptolepis* Mackenzie.)

Muddy border of small lake (Mad.); river flats (Yrk.); wet meadow (Bon. I.).

(Boreal-)temperate eastern American: Minn. to Nfld., southw. to Ind. and N.J.

Section 28. FERRUGINEAE

70. **C. misandroides** Fernald, Rhod. 17: 158. 1915. [Hr]

Calcicole: cliffs and talus above lake (Lac Pleureuse).

Boreal eastern American: Lake Mistassini, Gaspe, and Nfld.; closely related to the arctic *C. misandra* R. Br.

Section 29. VIRESCENTES

71. **C. pallescens** L., var. **neogaea** Fernald, Rhod. 44: 306. 1942 [Hs]

Dry banks and meadows (Gpe.); edge of pond (Tng.); road in woods (Drt.); slaty soil in meadow (Rim.).

(Boreal-)temperate eastern American: Ont. to Nfld., southw. to Mich., Ohio, Pa., and N.J.; with the species, boreal circumpolar.

Section 30. HIRTAE

a. Perigynium stiffly pubescent, strongly and conspicuously ribbed; perigynium-beak nearly half the length of the body, the teeth spreading, scabrous within; scales thin-margined, acute or awned; leaves flat and very sharp-pointed....72. *C. Houghtonii*
a. Perigynium with ribs largely obscured by the dense pubescence; teeth of beak short.
  b. Leaves flat with revolute margins, 2-5 mm. wide; culms sharply triangular; achenes straight-apiculate....................................73. *C. lanuginosa*
  b. Leaves strongly involute, less than 2 mm. wide; culms obtusely triangular; achenes bent-apiculate....................................74. *C. lasiocarpa,* var. *americana*

72. **C. Houghtonii** Torr. [Grh]

River gravels (Yrk.); dry roadside gravels (Yrk.); sandy beach (Yrk.); sand flats (Rim.); sandy soil (Bic; Lac Pleureuse).

(Boreal-)temperate American: n. Sask. to Nfld., southw. to Minn., Mich., and Me.

73. **C. lanuginosa** Michx. [Grh]

Swampy soil (Val.; Mal.; Mat.).

Temperate American: B.C. to e. Que., southw. to Calif., N. Mex., Ark., and Tenn.

74. **C. lasiocarpa** Ehrh., var. **americana** Fernald, Rhod. 44: 304. 1942. [Grh(-Hel)] (*C. filiformis* of Gray's Man., ed. 7.)

Swampy soil (Bic; Rim.; Mad.; Clr.; Tng.; Mal.; Gnd.; New Carlisle).

(Boreal-)temperate American: s. Alaska and Mack. to Nfld., southw. to Wash., Man., Iowa, and N.J.; with the species, boreal circumpolar.

Section 31. ANOMALAE

75. **C. scabrata** Schwein. [Hsr]

River banks (Rim.); gravelly and sandy beaches (Cap Chat; GCa.); meadows and swamps (Bic); subalpine places (Mtt.; Nic.).

Temperate eastern American: Mich. to e. Que., southw. mostly in the mts. to Tenn. and S.C.

Section 32. LIMOSAE

a. Perigynia swollen, nearly pointless, mostly a little shorter than the purple-black enveloping scales; spikes 1-3, only 3-10 flowered, drooping, borne in the axil of a minute awl-like and purple-auricled bract; culm obtuse and very smooth........ ....76. *C. rariflora*

a. Perigynia flattened; culms sharply angled.
  b. Scales broad, acute but not aristate, brown or purplish, hardly exceeding the minutely beaked perigynia; leaves 1-3 mm. wide, more or less glaucous; plant strongly stoloniferous, the fertile culms obliquely ascending........77. *C. limosa*
  b. Scales lanceolate, mostly long-aristate, much exceeding the scarcely beaked perigynia; leaves 2-4 mm. wide, deep green; plant loosely caespitose, the culms erect.
    c. Scales castaneous; culms glabrous.
      d. Culms 1-2·5 dm. high; spikes 4-8 mm. long.............78. *C. paupercula*
      d. Culms 1-8 dm. high; spikes 1-1·6 cm. long....78a. *C. paupercula,* var. *irrigua*
    c. Scales green with pale brown or yellowish margins; spikes 1-1·8 cm. long; culms tall, usually scabrous.........................78b. *C. paupercula,* var. *pallens*

76. **C. rariflora** (Wahl.) Smith. [Grh]

Edge of pools above beach (Bic Island); boggy meadow (Mal.); brackish marsh (Bnc.); alpine bog on serpentine tableland (Alb.); alpine meadow (Tbl.; Log.).

Arctic circumpolar, alpine: Aleutian Is., arctic Alaska, Yukon, n. Mack., Baffin, Hudson Bay, n. Lab., and Nfld., southw. in the mts. to Me.; w. and e. Greenland; Iceland; arctic and subarctic Eurasia.

77. **C. limosa** L. [Hsr]

Swampy soil (Bic; Mal.; Bnc.; Gnd.; New Carlisle; Nou.); cedar swamp (Bon.); subalpine and alpine bogs and meadows (Alb.; Log.; Ftn.).

Boreal circumpolar, alpine: Alaska, Yukon, Mack. (Mack. R. Delta, Great Bear L.), s. Hudson Bay, Lab., and Nfld., southw. to Calif., Nev., Utah, Colo., Iowa, Ind., and Del.; Iceland; arctic and alpine Eurasia.

A hybrid between this and the following species is reported from the large swamp at Coin du Banc.

78. **C. paupercula** Michx. [Hs]

Alpine bogs and meadows (Alb.; Tbl.; Log.).

(Arctic-)boreal circumpolar, alpine: Alaska, Yukon, Mack. (Great Bear L.) to n. Lab. and Nfld., southw. to Utah, Colo., Minn., and Pa.; Iceland; Eurasia.

78a. **C. paupercula,** var. **irrigua** (Wahl.) Fernald.

Swampy soil (Bic; Rim.; Cld.; Gpe.; Gnd.; Bon.); subalpine meadows (Tbl.; Log.). General in its habitat.

Southern part of the range.

78b. **C. paupercula,** var. **pallens** Fernald.

Swampy soil (Bic); cedar swamps (New Richmond; Car.).

Southern part of the range.

Section 33. Atratae

a. Scales lance-ovate, aristate, exceeding the beakless perigynia; spikes all sessile, dark brown or variegated; perigynia whitish and granular..............79. *C. Buxbaumii*

a. Scales obtuse, not exceeding the perigynia.
  b. Spikes 2-4, aggregated, 4-8 mm. long, erect, sessile or the lowest short-stalked; perigynia short-beaked, a little longer than the ovate purple-brown scales.
    c. Caespitose, the culms stiff, 0·5-3 dm. high; perigynia trigonous-obovoid, abruptly short-beaked, 2-2·5 mm. long, becoming reddish purple in maturity, strongly granular-papillose, the tips not recurving......................80. *C. norvegica*
    c. Usually slender and soft, less caespitose, 1·5-5 dm. high; perigynia ellipsoid or ellipsoid-obovoid, more prolonged, 2·5-3·5 mm. long, tapering to the beak, in age with widely spreading to recurving tips, whitish, stramineous or pale brown, less conspicuously granulose....................................81. *C. media*
  b. Spikes 3-6, all but the terminal one on slender peduncles, drooping when mature, 1-2·5 cm. long; perigynia short-beaked, about as long as the dark reddish brown to brownish black scales; culms rather sharp, 2-9 dm. high....82. *C. atratiformis*

79. **C. Buxbaumii** Wahl. [Hsr] (*C. polygama* Schkuhr.)

Swampy soil (Ann.; Fame Point; Anse à Valleau; Cld.; Pcé.; New Carlisle; New Richmond; Bon.).

Halophyte: salt marsh (Bnc.).

Boreal circumpolar: Alaska, Yukon, Mack. (Great Bear L.), James Bay, Côte Nord, and Nfld., southw. to Calif., Utah, Colo., Mo., and Ga.; w. Greenland; arctic and alpine Eurasia.

80. **C. norvegica** Retz. [Hs] (*C. alpina* Swartz, var *typica* Fernald; *C. Vahlii* Schkuhr; *C. Halleri* of authors; *See* Fernald, Rhod. 35: 222. 1933; 44: 304. 1942.)

Calcicole: alpine schists (Alb.; Tbl.; Mtt.; Log.; Bln.).

Arctic circumpolar, alpine: gap in western N.A.; Keewatin, Baffin, n. Lab., and Nfld., southw. to Man. and the mts. of Gaspe; Greenland; Iceland; arctic and alpine Eurasia.

81. **C. media** R. Br. ([Hs] (*C. alpina*, var. *inferalpina* Wahl.; *C. Vahlii*, var. *inferalpina* (Wahl.) Fernald; *C. angarae* Steud.; *See* Fernald, Rhod. 35: 220 and 398. 1933; 41: 203. 1939.)

Wet places (Bon.); cold woods (Ann.; Lou.).

Boreal circumpolar: Alaska, Yukon, Mack. (Mack. R. Delta, Great Bear L.), James Bay, Lab., and Nfld., southw. to B.C., Idaho, Minn., Mich., and N.B.; Eurasia.

82. **C. atratiformis** Britton. [Hs] (*C. atrata*, var. *ovata* (Rudge) Boott.)

Calcicole: sea cliffs (Bic; Mtn.; Méchins; Srl.; Marsouins; Prr.; Lou.; Tng.; For.; Pcé.; Bon. I.); river ledges and gravels (Mtn.; Cap Chat; Ann.; Cld.; Mad.; Drt.; Yrk.; Gnd.; Pab.; Bon.; PCa.; GCa.; Esc.; Res.; Mat.); calcareous sands (Pén.); calcareous alpine meadow (Tbl.); alpine schists (Alb.; Tbl.; Mtt.; Log.; Ftn.; Pem.; Col.; Nic.); edge of subalpine stream, Mt. Albert (Ruisseau du Plaqué-Malade).

Disjunct American: Yukon and Mack. to Alb. and Sask.; Great Lakes region; e. Que. to Lab. and Nfld., southw. to N.H. and Vt.; with *C. atrata* L., boreal circumpolar.

Section 34. ACUTAE

a. Flowering culms all or mostly arising laterally and not enveloped at base by the previous year's tufts of leaves; lower sheaths of fertile culms bladeless.

b. Pistillate spikes all nodding or curved, or the upper erect; perigynia green, the slim upper half empty and more or less tortuous; scales purple-margined and very obtuse; culms 5-7 mm. thick below, in clumps from exceedingly tough and cord-like roots..83. *C. torta*

b. Pistillate spikes all erect; culms slender to the base.

c. Perigynia broadly oval to suborbicular, inflated, brownish at maturity, 2-edged and 2-ribbed; achenes suborbicular; plant loosely caespitose; lower sheaths not at all or sparingly fibrillose, strongly purplish red-dotted..........84. *C. Haydenii*

c. Perigynia ovate, green at maturity, not inflated; achenes obovate; lower sheaths filamentose ventrally.

d. Plants forming beds; long horizontal stolons numerous; leaves flat or nearly so to base; sheaths hispidulous ventrally and with a narrow hyaline jagged-ciliate margin..85. *C. strictior*

d. Plants in dense tussocks; long horizontal stolons usually not conspicuous; leaves channelled and keeled towards base; sheaths smooth ventrally, the margin not as above..86. *C. stricta*

a. Flowering culms arising from centre of previous year's tufts of leaves and surrounded at base by dried-up leaves; lower sheaths of fertile culms with blades.

b. Lowest bract black-auricled, shorter than the inflorescence; pistillate scales with obsolete or slender midvein; strongly stoloniferous, the culms 1-few together, 1-4 dm. high; perigynia plano-convex, puncticulate, appressed; achenes 1·5-2 mm. long, 1 mm. wide..87. *C. Bigelowii*

b. Lowest bract equalling or exceeding the inflorescence; pistillate scales with slender midvein or broader light-coloured centre; culms taller, less stiff, in larger clumps.

c. Perigynia nerveless ventrally or with obscure impressed nerves.

d. Pistillate spikes 1-4 cm. long; perigynia narrowly to broadly elliptic, less than 3 mm. long, 1-1·5 mm. wide, nerveless; leaves 2·5-5 mm. wide.......... ....88. *C. aquatilis*

d. Pistillate spikes 2·5-8 cm. long; perigynia obovate, 3 mm. long, 1·75 mm. wide, obscurely few-nerved; leaves 2·5-8 mm. wide. .88a. *C. aquatilis*, var. *altior*

c. Perigynia conspicuously nerved or ribbed ventrally, the nerves raised.

d. Plants strongly stoloniferous, with horizontal stolons; perigynia from nearly sessile to strongly stipitate; lowest bract shorter than or only moderately exceeding the inflorescence......................................89. *C. nigra*

d. Plants densely caespitose, forming large clumps, the rootstock very short; perigynia slightly yellow-glandular-dotted, slenderly short-stipitate; lowest bract strongly exceeding the inflorescence.
  e. Perigynia ovate-elliptic, short-beaked; scales obtuse........90. *C. lenticularis*
  e. Perigynia ovate-oblong, acuminate or tapering to a point, longer and more convex; scales less obtuse to short-acute..90a. *C. lenticularis*, var. *albi-montana*

83. **C. torta** Boott. [Hs]

Calcicole: river ledges (Bic; Rim.; Cap Chat; GCa.).

Temperate eastern American: Minn. to e. Que., southw. to Ark., Tenn., and N.C.

84. **C. Haydenii** Dewey. [Hsr]

Swampy soil (Zén.).

Temperate eastern American: Minn. to e. Que., southw. to Mo., Ill., and N.J.

85. **C. strictior** Dewey. [Hsr] (*C. stricta*, var. *strictior* Carey.)

Swampy soil (Bon.); alpine meadow (Nic.).

Temperate eastern American: Minn. to e. Que., southw. to Iowa and D.C., and in the mts. to Tenn. and N.C.

86. **C. stricta** Lam. [Hsr]

Swampy soil (Mtn.; Drt.; Dou.). General in its habitat.

(Boreal-)temperate eastern American: Great Lakes region; Gaspe Pen. to Me., and along the Coastal Plain to Tex.

87. **C. Bigelowii** Torr. [Grh] (*C. rigida* Good., not Schrank; *C. concolor* of authors, not R. Br.)

Alpine rocks (Alb.; Tbl.; Log.; Mtt.; Ftn.; Bln.).

Arctic circumpolar, alpine: Aleutian Is., Alaska, Yukon, Banks I., Victoria I., Coronation Gulf, Keewatin, Devon, Baffin, n. Lab., and Nfld., southw. in the mts. to B.C. and N.Y.; w. and e. Greenland; Iceland; Faeroes; Spitsbergen; arctic and alpine Eurasia.

88. **C. aquatilis** Wahl. [Hs]

Calcicole: river gravels (Mtn.; Cld.; Mad.; Ren.; Drt.; Yrk.; Gnd.; Bon.); swampy ground (Bic; Lou.; Tng.; Ros.; Dou.; New Richmond; Nou.); alpine meadows (Tbl.; Log.).

Arctic circumpolar, alpine: Aleutian Is., Alaska, Yukon, Mack. (Mack. R. Delta, Great Bear L.), Banks I., Victoria I., Melville I., Southampton I., Hudson Bay, Ellesmere, Devon, s. Baffin, n. Lab., and Nfld., southw. to Calif., Utah, N. Mex., Ont., Que., and N.Y.; w. Greenland; Eurasia.

88a. **C. aquatilis,** var. **altior** (Rydb.) Fernald. (*C. substricta* (Kukenth.) Mackenzie; *See* Fernald, Rhod. 44: 295. 1942.)

Swampy soil (Rim.; Mtn.; Dou.; Bon.).

Probably range of the species.

C. aquatilis, var. *stans* (Drej.) Boott (var. *epigeios* Laest.) is reported by Macoun (Cat. Can. Pl. IV: 144. 1888) from meadows at the mouth of Madeleine River. According to Fernald, however (Rhod. 44: 295. 1942), it seems to be only a dwarfed state and hardly worth varietal or even formal recognition.

89. **C. nigra** (L.) Reich. [Hsr] (*C. acuta*, var. *nigra* L.; *See* Fernald, Rhod. 44: 300-302. 1942.)

Swampy soil (Bic; Rim.; Mtn.; Prr.; Lou.; Manche d'Epée; Gpe.); alpine summit (Tbl.).

Amphi-Atlantic: Lab. and Nfld., southw. to R.I.; Greenland; w. Europe.

90. **C. lenticularis** Michx. ([Grh]

Calcicole: meadows and swamps (Bic); river gravels (Ann.; Bon.; Irn.); alpine schists (Alb.; Bln.); alpine swamps (Tbl.; Ftn.; Log.); edge of subalpine lake (Alb.).

Boreal American: Alaska and Mack. (Great Bear L.) to Lab. and Nfld., southw. to Idaho and Mass.

90a. **C. lenticularis,** var. **albi-montana** Dewey.

Alpine meadows (Tbl.); edge of subalpine stream (Alb.); moist woods (Yrk.).

(Boreal-)temperate eastern American, alpine: Gaspe and Nfld. to Me. and N.H.

Section 35. CRYPTOCARPAE

a. Pistillate spikes strictly erect, sessile or almost so.
  b. Leaves 2·5 mm. wide or less, involute towards the tip; lower bracts subspathaceous; culms 3-10 cm. high, dull purplish red at base; tidal marshes........................91. *C. subspathacea*
  b. Leaves 2-6 mm. wide, flat or revolute; lower bracts normal; culms 3-10 dm. high.
    c. Scales ovate, longer than and about as wide as and concealing the perigynia, firm, thickish, convex, clasping, reddish brown; pistillate spikes 1-3 cm. long; culms 1-3 dm. high ....92. *C. salina,* var. *lanceata*
    c. Scales ovate or oblong-ovate, much longer than and not concealing the perigynia, thin, flat or nearly so, not clasping, purplish black; pistillate spikes 1-8 cm. long; culms 1·5-9 dm. high ....92a. *C. salina,* var. *kattegatensis*

a. Pistillate spikes peduncled, more or less spreading or drooping.
  b. Not densely caespitose; stolons very long, horizontal; leaves yellowish green; pistillate scales whitish or brown, produced into a very conspicuous slender serrulate cusp 3-6 times the length of the nearly orbicular pale perigynia........................ 93. *C. paleacea*
  b. Densely caespitose; stolons very short, ascending; leaves green; awn of pistillate scales 1-2 times length of perigynia.
    c. Sheaths smooth; scales abruptly contracted into the serrulate awn........................94. *C. crinita*
    c. Sheaths strongly rough-hispidulous; scales tapering into the serrulate awn........................94a. *C. crinita,* var. *gynandra*

91. **C. subspathacea** Wormsk. [Grh] (*C. salina*, var. *subspathacea* Tuckerm.).

Halophyte: salt marshes (Bic; Ann.; Ros.).

Arctic circumpolar (maritime): Alaska, Coronation Gulf, Devon, Baffin, Hudson Bay, n. Lab., southw. to e. Que.; w. and e. Greenland; Iceland; Spitsbergen; arctic Eurasia.

92. **C. salina** Wahl., var. **lanceata** Kukenth. [Grh]

Halophyte: salt marshes (Bic; Rim.; Cap.; Lou.; Val.; Tng.; Ros.; Bnc.).

Boreal circumpolar (maritime): Alaska, Hudson Bay, Lab., southw. to e. Que.; Greenland; n. Europe; gap in n. Siberia.

92a. **C. salina,** var. **kattegatensis** Almq. (*C. recta* Boott.)

Halophyte: salt marshes (Bic; Trl.; Lou.; Mad.; Val.; Tng.; Ren.; Ros.; Drt.; Yrk.; Jhn.; Mal.; Bnc.; Gpe.; Nou.).

Boreal circumpolar (maritime): Aleutian Is., Alaska, Hudson Bay, Lab., and Nfld., southw. to Mass. and Me.; n. Europe.

93. **C. paleacea** Wahl. [Grh] (*C. paleacea,* var. *transatlantica* Fernald; *See* Rhod. 44: 293. 1942; *C. maritima* O. F. Muell.)

Halophyte: salt marshes (Bic; Tng.; Ros.; Gpe.; Bnc.; Bon.).

Psammophilous halophyte: seashore (Bic; Mtn.; Ren.; Pcé.; Bon. I.; Drt.; Yrk.; Nou.; Esc.).

Boreal circumpolar (maritime): gap in western N.A.; Hudson Bay to Lab. and Nfld., southw. to Mass. and e. Que.; Greenland; n. Europe.

94. **C. crinita** Lam. [Hsr]

Swampy soil (Bic; Rim.; Mad.; Val.; For.; Yrk.; GCa.).

(Boreal-)temperate eastern American: Minn. to Nfld., southw. to Tex. and Fla.

94a. **C. crinita,** var. **gynandra** (Schwein.) Schwein. & Torr.

Wet places (Bic; Mét.; Cap Chat; Ren.; Val.; Ros.; Cap aux Os).

(Boreal-)temperate eastern American: Mich. to Nfld., southw. to La. and Fla.

Section 36. ORTHOCERATES

95. **C. pauciflora** Lightf. [Grh]

Wet ground (Nou.); cedar swamp (Mal.); alpine bogs (Alb.; Tbl.; Log.; Ftn.).

Boreal circumpolar, alpine: Alaska to Wash.; gap in continental western N.A.; Minn., James Bay, Lab., and Nfld., southw. to Wis., Mich., Pa., N.H., and N.S.; n. Eurasia.

Section 37. FOLLICULATAE

96. **C. Michauxiana** Boeckl. [Hs] (*C. abacta* Bailey.)

Calcicole: swampy soil (Lac Pérot, Matane co.; Mad.); edge of subalpine lake (Lac des Américains, Tbl.).

Halophyte: salt marsh (Bnc.).

Boreal eastern American: Mich. to Lab. and Nfld., southw. to Pa. and N.H.; e. Asia.

Section 38. PSEUDO-CYPEREAE

a. Perigynia suborbicular in cross-section, inflated, membranous; ligules wider than long or about as wide as long; stolons present..........................97. *C. hystericina*

a. Perigynia flattened-triangular, scarcely inflated, coriaceous; ligules much longer than wide; culms caespitose and not stoloniferous.
  b. Teeth of perigynia recurved-spreading, 1·25-2 mm. long; spikes 13-17 mm. thick; leaves 6-16 mm. wide; culms stout, 5-15 dm. high..................98. *C. comosa*

b. Teeth of perigynia erect or little spreading, 0·5-1 mm. long; spikes 8-11 mm. thick, very compactly flowered; leaves 5-10 mm. wide; culms 5-10 dm. high...99. *C. Pseudo-Cyperus*

97. **C. hystericina** Muhl. [Hsr]

Edge of marly pond (Lac Porc-Epic, Bic); swampy soil (Pcé.; Bon.); brackish swamp (Bnc.); cedar swamp (New Richmond).

(Boreal-)temperate American: Alb. to Nfld., southw. to Calif., Tex., Ky., and Va.; Jamaica.

98. **C. comosa** Boott. [Hs]

Muddy edge of stream (Ann.).

Temperate American: Minn. to e. Que., southw. to La. and Fla.; also locally in the Pacific Coast states.

99. **C. Pseudo-Cyperus** L. [Hs]

Swampy soil (Bic; Mad.; Gnd.; Bon.; Cha.); cedar swamps (New Carlisle; Car.).

(Boreal-)temperate circumpolar: Sask. to Nfld., southw. to Minn., Ind., and N.Y.; Europe.

Section 39. PALUDOSAE

100. **C. lacustris** Willd. [Grh-HH] (*C. riparia* Curtis, var. *lacustris* (Willd.) Kukenth.)

Swampy ground (St. Mathieu, Rimouski co.).

Temperate American: Sask. to e. Que., southw. to Iowa and Va.

Section 40. VESICARIAE

a. Achenes lenticular; stigmas 2; perigynia scarcely inflated, nerveless or nearly so, puncticulate, dull greenish yellow or brownish-tinged, with a short subentire beak; scales light to dark brown; leaves nearly filiform......101. *C. saxatilis*, var. *miliaris*

a. Achenes triangular; stigmas 3; perigynia inflated, strongly nerved, with a bidentate beak.

b. Pistillate spikes oblong-cylindric; perigynia numerous, long-beaked.

c. Perigynia reflexed; bracts several times longer than the inflorescence...102. *C. retrorsa*

c. Perigynia ascending; bracts shorter.

d. Rootstocks short-creeping; culms sharply angled and generally harsh above, comparatively slender; leaves green, 2-7 mm. wide..........103. *C. vesicaria*

d. Rootstocks sending forth long, stout, horizontal, whitish stolons; culms bluntly triangular, smooth or more or less roughened above; leaves light green or yellowish green, 2-12 mm. wide.

e. Pistillate scales oblong to ovate, blunt to merely acute, not prolonged at tip, shorter than perigynia..............................104. *C. rostrata*

e. Pistillate scales narrowly ovate to linear-lanceolate, tapering to an acuminate tip or awned, often nearly equalling or the lower often exceeding the perigynia.

f. Culms coarse, 0·2-1 cm. thick above upper sheaths, 3-12 dm. high; leaves 4-12 mm. wide; pistillate spikes cylindric, 2-15 cm. long, 0·9-2 cm. thick; perigynia crowded, 4-10 mm. long........104a. *C. rostrata*, var. *utriculata*

f. Culms very slender, barely 1 mm. thick, 3-5 dm. high; leaves 2-5 mm. broad; pistillate spikes ovoid to short-oblong, 1-2·5 cm. long; perigynia few, 4-6 mm. long........................104b. *C. rostrata*, var. *ambigens*

b. Pistillate spikes suborbicular; perigynia 3-15, short-beaked; leaves and bracts very numerous, becoming involute; culms very slender but stiff, from a slender stoloniferous base..105. *C. oligosperma*

101. **C. saxatilis** L., var. **miliaris** (Michx.) Bailey. [Grh(-Hel)] (*C. miliaris* Michx.)

Moist ground (Lac Matapédia); edge of subalpine lake (Lac des Américains, Tbl.); alpine meadows (Tbl.; Log.).

Arctic American, alpine: B.C., s. Baffin, n. Que., island in Hudson Str., Lab., and Nfld., southw. to Me.; with the species, arctic circumpolar.

102. **C. retrorsa** Schwein. [Hs]

Wet places (Bic; Mét.; Mtn.; Cap Chat; Lou.; Tng.; Drt.; Yrk.; Nou.; Mat.); dried bog (Gnd.). General in its habitat.

(Boreal-)temperate American: Mack. to Nfld., southw. to Oreg., Colo., Iowa, Ind., and N.J.

103. **C. vesicaria** L. [Grh(-Hel)]

Wet places (Marsouins; Gnd.; Bon.).

Boreal circumpolar: B.C. to s. Lab. and Nfld., southw. to Calif., Nev., Colo., Mo., Ky., W. Va., Pa., and Conn.; Greenland; Eurasia; Africa.

104. **C. rostrata** Stokes. [Grh(-Hel)] *See* Fernald, Rhod. 48: 145-146. 1946.

Alpine swamp (Tbl.).

Boreal circumpolar, alpine: Alaska, Yukon, Mack. (Great Bear L.), James Bay, Lab., and Nfld., southw. to Sask. and Vt., and on high mts. to s. Calif. and Colo.; s. Greenland; Iceland; Eurasia.

104a. **C. rostrata,** var. **utriculata** (Boott) Bailey.

Swampy ground (Bic; Rim.; Cld.; Tng; Ren.; Yrk.; Gnd.; Bnc.; Bon.; GCa.); cedar swamp (New Carlisle); alpine bog (Tbl.). General in its habitat; the common American form.

Boreal circumpolar: B.C. to Lab. and Nfld., southw. to Calif., N. Mex., S. Dak., Wis., Ind., W. Va., and Del.; s. Greenland; Eurasia.

104b. **C. rostrata,** var. **ambigens** Fernald.

Cedar swamp (New Carlisle); edge of subalpine lake (Lac des Américains, Tbl.); subalpine ponds (Tbl.).

Temperate eastern American: e. Que. to Me.

A hybrid, *C. rostrata* × *saxatilis,* var. *miliaris* Fernald (× *C. mainensis* Porter), has been collected from boggy alpine meadows of Tabletop Mountain (type station; *See* Rhod. 10:48. 1908).

105. **C. oligosperma** Michx. [Grh(-Hel)]

Wet places (Lac Pérot, Matane co.); alpine bog (Tbl.).

Boreal American: Mack. (Great Bear L.), Lab., and Nfld., southw. to Ind., Pa., and Mass.

Section 41. LUPULINAE

106. **C. intumescens** Rudge, var. **Fernaldii** Bailey. [Hs] (*C. intumescens* of Gray's Man., ed. 7; *See* Fernald, Rhod. 44: 322. 1942.)

Swampy ground and damp woods (Bic; Rim.; Mét.; R. Cap Chat; Ann.; Drt.; Yrk.; GCa.; Nou.); edge of subalpine lake (Lac Ste. Anne). General in its habitat.

Boreal American: Man., Keewatin, to Nfld., southw. to Minn. and N.H., and in the mts. to N.C.

Var. *Fernaldii,* forma *ventriosa* Fernald, with distended ovoid perigynia, has been collected in the Gaspe Peninsula.

17. ARACEAE

(Arum Family)

a. Spadix subtended by a spathe; leaves broad.
  b. Spathe enveloping the spadix.
    c. Spadix elongated, mostly dioecious; perianth wanting; spathe hooded, short-acuminate; leaves 3-foliolate, mostly 2 ....1. *Arisaema*
    c. Spadix globular; flowers perfect, with perianth; spathe very fleshy, shell-shaped, spotted and striped with purple and yellow, incurved; leaves simple ....2. *Symplocarpus*
  b. Spathe flat, spreading or reflexed, the upper surface white; flowers perfect; perianth wanting; leaves simple, cordate ....3. *Calla*
a. Spadix naked, without an obvious spathe, cylindrical; flowers perfect, with perianth; leaves linear; scape leaf-like and prolonged far beyond the yellowish green spadix.. ....4. *Acorus*

1. Arisaema Martius

(Jack-in-the-Pulpit)

1. **A. atrorubens** (Ait.) Blume. [Gst] (*A. triphyllum* of Gray's Man., ed. 7; *See* Fernald, Rhod. 42: 252. 1940.)

Woods at river mouths (Mat.; GCa. (northeastern limit)); maple woods (Sacré-Cœur).

Temperate American: Man. to e. Que., southw. to e. Tex., Mo., Tenn., and S.C.

2. Symplocarpus Salisb.

(Skunk Cabbage)

1. **S. foetidus** (L.) Nutt. [Grh]

Swampy ground (Pte. au Père) (northeastern limit).

Temperate eastern American: Minn. to e. Que., southw. to Iowa and Ga.; e. Asia.

3. Calla L.

(Water Arum. Wild Calla)

1. **C. palustris** L. [Hel]

River mouth (Gnd.); stream (Mar.); swampy soil (Mét.; Mtn.; Drt.; Dou.; Pcé.; Bon.; Nou.).

Boreal circumpolar: Alaska, Yukon, Mack. (Mack. R. Delta, Great Slave L.), s. Hudson Bay, and Nfld., southw. to B.C., Sask., Minn., Ind., Va., and N.J.; Eurasia.

4. Acorus L.

(Sweet Flag. Calamus)

1. **A. Calamus** L. [Hel]

River estuary (Rim.).

Temperate circumpolar: gap in western N.A.; Minn. to e. Que., southw. to Tex. and Fla.; Eurasia.

18. LEMNACEAE

(Duckweed Family)

1. Lemna L.

(Duckweed)

1. **L. minor** L. [HH]

Pool (Bic).

Boreal circumpolar: Alaska, Mack. (Great Slave L.), s. Hudson Bay, Lab., southw. to Mexico and S. Am.; Eurasia; Africa; Australia.

19. ERIOCAULACEAE

(Pipewort Family)

1. Eriocaulon (Gronov.) L.

(Pipewort)

1. **E. septangulare** With. [HH-Hel] (*E. articulatum* (Huds.) Morong.)

Shallow water of lakes (Lac Pérot, Matane co.; Lac des Sept Iles, Cha.; Sayabec).

(Boreal-)temperate eastern American: Minn. to Mingan Is. and Nfld., southw. to Ind. and N.C.; relic in western Scotland and Ireland.

20. JUNCACEAE

(Rush Family)

a. Capsule 3-celled, many-seeded; sheaths open; plants never hairy .... 1. *Juncus*
a. Capsule 1-celled, 3-seeded; sheaths closed; plants often hairy............ 2. *Luzula*

1. Juncus L.

(Rush)

a. Inflorescence appearing lateral, the involucral leaf erect, similar to and continuing the naked scape; rootstocks creeping.
  b. Perianth-segments green or finally yellow.
    c. Stamens 3; sepals 2·5-3·5 mm. long, rarely exceeding the capsule; involucral leaf much shorter than the stem.
      d. Culms not grooved.............................. 1. *J. effusus*, var. *solutus*
      d. Culms grooved .... 1a. *J. effusus*, var. *Pylaei*
    c. Stamens 6; sepals about equalling the capsule; involucral leaf equalling the stem or longer .... 2. *J. filiformis*

b. Perianth-segments with reddish brown stripes on each side of the median nerve; anthers 3-4 times as long as the filaments.

c. Capsule ovate-mucronate but not acuminate; inflorescence compact...3. *J. balticus,* var. *littoralis*

c. Capsule lanceolate, long-acuminate..............3a. *J. balticus,* var. *stenocarpus*

a. Inflorescence terminal.

b. Leaves flat or somewhat terete, or setaceous and channelled, but never septate (divided by partitions).

c. Annuals with soft bases and fibrous roots; inflorescence loose, elongated, forming more than one-third the total length of the plant.

d. Flowers solitary and remote; all of the perianth-segments lanceolate; grains acuminate at both ends....................................4. *J. bufonius*

d. Top flowers clustered; internal perianth-segments obtuse or rounded; grains truncate at summit..........................4a. *J. bufonius,* var. *halophilus*

c. Perennials; inflorescence more contracted.

d. Inflorescence 1-4 flowered; leaf-sheaths with fimbriate auricles...5. *J. trifidus*

d. Inflorescence many-flowered; leaf-sheaths with entire auricles.

e. Cauline leaves 1-2; maritime ....6. *J. Gerardi*

e. Cauline leaves absent.

f. Auricles cartilaginous, yellow when dried.....................7. *J. Dudleyi*

f. Auricles membranous, whitish or brownish...................8. *J. macer*

b. Leaves hollow, nodulose (with septa at regular intervals).

c. Leaves grooved above; septation imperfect, imperceptible from the exterior; inflorescence of 1-4 heads.

d. Body of seed 1 mm. or more in length.

e. Leaf-sheaths not auricled ....9. *J. castaneus*

e. Leaf-sheaths auricled ....10. *J. stygius,* var. *americanus*

d. Body of seed less than 1 mm. long; alpine plants...........11. *J. albescens*

c. Leaves not grooved above; septation perfect, usually perceptible from the exterior; heads rather numerous.

d. Stamens 6, opposite the perianth-segments; seeds obtuse or acute, but not caudate-appendaged.

e. Flowers solitary or in pairs, often accompanied or replaced by fascicles of small leaves; plants creeping or floating, capillary, reddish in water; primary leaves elongate, but the repent branches bearing fascicles of small leaves ....12. *J. subtilis*

e. Flowers in glomerules; stems erect.

f. Glomerules hemispherical; sepals blunt or acuminate, at most mucronate-tipped; capsules ovoid or ellipsoid; involucral bract much shorter than the inflorescence.

g. Sepals acuminate; branches of the inflorescence widely divergent ....13. *J. articulatus*

g. Sepals blunt, often mucronate-tipped; branches of the inflorescence erect or strongly ascending.

Flowers all sessile or nearly sessile in dense heads....14. *J. alpinus*

Some flowers elevated on elongate pedicels...14a. *J. alpinus,* var. *rariflorus*

f. Glomerules spherical; sepals subulate; capsules subulate or lance-subulate; flowers 3-4 mm. long, reddish brown; involucral bract usually exceeding the inflorescence...15. *J. nodosus*

d. Stamens 3; seeds with definite caudate tips, about 1 mm. long; inflorescence elongate, strict and narrow, 3-6 times longer than broad; capsule much exceeding the calyx, gradually pointed...............16. *J. brevicaudatus.*

1. **J. effusus** L., var. **solutus** Fern. & Wieg., Rhod. 12: 90. 1910. [Hr]
Common Rush

Edge of marly pond (Lac Porc-Epic, Bic); river gravels (Bon.); swampy ground (Rim.).

(Boreal-)temperate eastern American: Wis. to Nfld., southw. to Tex. and Fla.; with the species, boreal circumpolar.

1a. **J. effusus**, var. **Pylaei** (Laharpe) Fern. & Wieg., *See* Rhod. 12: 92. 1910.

Swampy soil (Mét.; Gpe.); gravelly beaches (Cap Chat; Ann.).

(Boreal-)temperate eastern American: Wis. to Nfld., southw. to W. Va.

2. **J. filiformis** L. [Grh]

Swampy soil (Mtn.; Tng.; Gpe.; Gnd.; Bon.; Mat.; Res.); subalpine swamps (Alb.; Tbl.; Log.; Mtt.; Bln.).

Halophyte: salt marshes (Bic; Bnc.).

(Arctic-)boreal circumpolar: Alaska, Yukon, Mack., s. Hudson Bay, n. Lab., and Nfld., southw. to Oreg., Utah, Mich., and Pa.; Patagonia; s. Greenland; Iceland; arctic Europe; Asia.

3. **J. balticus** Willd., var. **littoralis** Engelm. [Grh]

Slaty sea ridges (Bic); wet places (Manche d'Epée; St. Majorique).

Halophyte: salt marshes (Bic; Mét.; Gpe.; Bnc.; Car.).

Psammophilous halophyte: sea beach (Bic; Pte. au Père; Mtn.).

Boreal American (essentially maritime): Alaska to Lab. and Nfld., southw. to the Great Lakes region, Pa., and N.Y.; the whole species boreal circumpolar.

Var. *littoralis*, forma *gracilis* Buch., with a few-flowered inflorescence, has been collected beside Dartmouth River.

3a. **J. balticus**, var. **stenocarpus** Fern. & Buch., *See* Marie-Victorin, Contrib. Lab. Bot., Univ. Montréal 14: 153. 1929.

Halophyte: salt marshes (Bic; Drt.; Bon. (type station)).

Quebec endemic: Cap à l'Aigle; Bic; Gaspe Peninsula.

4. **J. bufonius** L. [T]

Calcicole: marly pond (Lac Porc-Epic, Bic); river gravels (Res.); sea ledges (Mét.; For.; Jhn.; Bon. I.).

Halophyte: salt marshes (Bic; Rim.; Manche d'Epée; Bon.).

Boreal circumpolar: Alaska, Yukon, and Mack. to Lab. and Nfld., southw. to Calif. and Fla.; Greenland; Iceland; Faeroes; Eurasia.

4a. **J. bufonius**, var. **halophilus** Buch. & Fern.

Halophyte: brackish shores and salt marshes (Bic; Mtn.; Cap.; Drt.; Bon.; New Carlisle; PCa.; Car.).

Boreal circumpolar (maritime): Alb. to Lab., southw. to Nebr. and Mass.; Europe.

5. **J. trifidus** L. [Hsr]

Slaty cliffs (Bic Mt.); alpine schists (Alb.; Tbl.; Log.; Mtt.; Ftn.; Bln.); sea cliffs (For.).

Arctic circumpolar, alpine: gap in western N.A.; s. Baffin, n. Lab., and Nfld., southw. in the mts. to N.Y. and N.Eng.; Greenland; Iceland; Faeroes; arctic and alpine Eurasia.

6. **J. Gerardi** Loisel. [Grh] Black Grass

Halophyte: salt marsh (Dou.).

Psammophilous halophyte: sand dunes (Pén.).

(Boreal-)temperate circumpolar (maritime): Pacific coast; Great Lakes region; e. Que. and Nfld., southw. to Fla.; Eurasia; n. Africa.

7. **J. Dudleyi** Wiegand. [Hr]

Wet places (Bic; Rim.; Mét.; R. Blanche; Cap Chat; Trl.; Bon.; Car.; Nou.; Mat.).

(Boreal-)temperate American: central Yukon and n. Sask. to Nfld., southw. to Mex., Kans., and Va.; adventive in Scotland and Germany.

8. **J. macer** S. F. Gray. [Hr] (*J. bicornis* Michx.; *J. tenuis* of Am. auth., not Willd.) Path Rush

Field (Bic); roadside (GCa.; Irn.); sandy shores (Lac au Saumon).

Boreal American: almost throughout N.A. except in the extreme North; adventive in Europe and Africa.

Forma *anthelatus* Wiegand, with cyme 6-18 cm. long and flowers usually 2·5-3·5 mm. long, has been collected from a damp meadow at Cascapedia.

Forma *Williamsii* (Fern.) Hermann, with branches of the cyme 1-2 cm. long, closely 3-6-flowered, strongly secund, has been collected from roadsides and portages at Ste. Irène, Grand Lac Matane, and Nouvelle.

9. **J. castaneus** Smith. [Hr] Rydberg, p. 153.

Calcicole: alpine cliffs above Lac des Américains (Tbl.); calcareous alpine meadow (Tbl.); alpine hornblende schists (Log.; Pem.).

Arctic circumpolar, alpine: Alaska, Yukon, Mack., Ellesmere, Devon, Baffin, Hudson Bay, n. Lab., and Nfld., southw. in the mts. to N. Mex. and Gaspe; w. and e. Greenland; Iceland; Spitsbergen; arctic and alpine Eurasia.

10. **J. stygius** L., var. **americanus** Buch. [Hs]

Marly bogs (Mad.; Gnd.; Bon.); alpine swamps (Alb.; Tbl.).

Boreal American: Alaska to Lab. and Nfld., southw. to Minn. and N.Y.; e. Asia; the whole species boreal circumpolar.

11. **J. albescens** (Lange) Fernald, *See* Rhod. 26: 201-203. 1924. [Hr] (*J. triglumis* of Am. authors.)

Calcicole: alpine cliffs above Lac des Américains (Tbl.).

Arctic American, alpine: Alaska, Coronation Gulf, Ellesmere, Baffin, Hudson Bay, n. Lab., and Nfld., southw. in the mts. to N. Mex. and N.Y.; w., s., and e. Greenland; with *J. triglumis* L., arctic circumpolar.

12. **J. subtilis** Mey. [Grh]

Sea cliffs (Bic).

(Boreal-)temperate eastern American: Que. to Nfld., southw. to Me.; w. and e. Greenland.

13. **J. articulatus** L. [Grh]

Damp river shores (PCa.); dried pond (Bic); brackish alluvium in estuary (PCa.); wet roadside (Pcé.).

Boreal circumpolar: B.C. to Lab. and Nfld., southw. to N.Y. and Mass.; Iceland; Eurasia.

14. **J. alpinus** Vill. [Grh]

Swampy soil (Bic; Gnd.; Car.; Nou.; Mat.); mud flat (Manche d'Epée); brackish soil (Jhn.). General in its habitat.

Boreal circumpolar: Alaska, Yukon, Mack. (Great Slave L.) to Mingan Is. and Nfld., southw. to Wash., Idaho, Nebr., and Pa.; Greenland; Iceland; Eurasia.

14a. **J. alpinus,** var. **rariflorus** Hartm. (*J. alpinus,* var. *insignis* Fries.; *See* Fernald, Rhod. 35: 233. 1933.)

Swampy soil (Bic; Marsouins; Cld.; Gnd.; God.; Drt.; Jhn.; Bon.; PCa.; Car.; Nou.); clay bank (Mtn.); salt marshes (Mtn.; Ann.).

Range of the species: also s. Lab.

A hybrid, × *J. nodosiformis* Fernald (*J. alpinus* × *nodosus* Buch.) is reported from Gaspe county (*See* Contrib. Lab. Bot. Univ. Montreal 14: 178. 1929; Rhod. 35: 235. 1933).

15. **J. nodosus** L. [Gst] Knotted Rush

Marly pond shores (Bic; Tng.; Oie); river shores (Ann.; Ren.; Bon.; PCa.; Nou.; Mat.); swampy soil (Mét.; R. Blanche; Plr.; Manche d'Epée; For.; Mar.; Car.; Albertville); cedar swamp (Mont Joli); salt marsh (Jhn.; Bnc.).

Boreal American: Alaska, Mack. (Great Bear L.), James Bay, Nfld., southw. to Nev., N. Mex., Tex., Ill., and Va.

16. **J. brevicaudatus** (Engelm.) Fernald. [Hs]

Swampy soil (Bic; Rim.; Mtn.; Cap Chat; Mad.; Jhn.; Cha.; Oie; PCa.; Car.); salt marsh (Bnc.).

(Boreal-)temperate American: n. Alb. and n. Sask. to s. Lab. and Nfld., southw. to W. Va., Pa., and Conn.

2. LUZULA DC.

(Wood Rush)

a. Flowers solitary at the tips of the ultimate branches of the inflorescence.
b. Inflorescence an umbel; flowers 3-4·5 mm. long; seeds with a long curved appendage; leaves hairy..1. *L. acuminata*
b. Inflorescence a loose decompound cyme; flowers 2 mm. long; seeds not appendaged; plant nearly smooth..................................2. *L. parviflora*

a. Flowers crowded in spikes or glomerules.
b. Flowers in dense nodding spike-like panicles, sessile; sepals bristle-pointed, scarcely as long as the abruptly short-pointed capsule..............3. *L. spicata*
b. Flowers in mostly peduncled glomerules.
c. Leaves with involute subulate tips; bracts at base of flowers ciliate-fimbriate; sepals taper-pointed, longer than the obtuse capsule..............4. *L. confusa*
c. Leaves flat, with blunt callous tips; bracts at base of flowers entire or merely lacerate.
d. Perianth dark, 2-2·5 mm. long; capsules castaneous to almost black, nearly equalling or exceeding the sepals; seeds 1-1·6 mm. long, tipped by a minute caruncle only 0·1-0·2 mm. long; inflorescence dense...........5. *L. sudetica*

d. Perianth and capsules pale brown to ferruginous; seeds 1·5-2 mm. long, with caruncle 0·4-0·7 mm. long.
  e. Umbel loose; spikes mostly on ascending or erect simple or slightly forked peduncles; perianth 2·5-3 mm. long, shorter than or equalling the capsule.. ....6. *L. multiflora*
  e. Umbel very condensed, usually with several sessile or subsessile spikes, with or without stiff rays up to 3·5 cm. long; perianth 3-4 mm. long and greatly exceeding the capsule......................6a. *L. multiflora*, var. *acadiensis*

1. **L. acuminata** Raf. [Hsr] (*L. saltuensis* Fernald; *L. carolinae* Wats., var. *saltuensis* Fernald; *See* Rhod. 40: 404. 1938; 46: 4. 1944.)

Clearing in woods (Pcé.; For.).

(Boreal-)temperate American: Sask. to Nfld., southw. to Minn., Ind., and N.J., and in the mts. to Ga.; e. Asia (Kamtchatka).

2. **L. parviflora** (Ehrh.) Desv. [Hs]

Swampy and hilly woods and clearings (Bic; Ann.; Cld.; Lbn.; Pcé.; Bon. I.; GCa.; Mat.; Irn.); cedar swamp (Car.); subalpine woods (Alb.; Tbl.; Log.; Ftn.; Col.; Lyl.; Mt. Noble).

Boreal circumpolar: Aleutian Is., Alaska, Yukon, Mack. (Mack. R. Delta, Great Bear L.), s. Keewatin, James Bay, Lab., and Nfld., southw. to Minn. and Mass., and in the mts. to Calif. and Ariz.; w. and e. Greenland; Iceland; Faeroes; n. Eurasia.

3. **L. spicata** DC. [Hs]

Sea cliffs (Srl.); calcareous alpine cliffs above Lac des Américains (Tbl.); alpine schists (Alb.; Tbl.; Log.; Ftn.; Bln.).

Arctic circumpolar, alpine: Aleutian Is., Alaska, Yukon, arctic coast of Mack., Hudson Str., Baffin, n. Lab., and Nfld., southw. in the mts. to Calif., Colo., N. Mex., and N.H.; w., s., and e. Greenland; Iceland; Faeroes; arctic and alpine Eurasia.

4. **L. confusa** Linde. [Hrr] (*L. hyperborea* R.Br.)

Alpine schists (Tbl.; Log.; Mtt.; Ftn.).

Arctic circumpolar, alpine: Aleutian Is., Alaska, Melville I., Yukon, Mack., Keewatin, Ellesmere, Devon, Bylot I., n. Baffin, Melville, Southampton I., n. Lab., southw. in the mts. to Alb. and N.H.; whole of Greenland; Iceland; Faeroes; Spitsbergen; arctic and alpine Eurasia.

5. **L. sudetica** (Willd.) DC., *See* Fernald, Rhod. 47: 265. 1945. [Hs] (*L. campestris*, var. *alpina* Gaudin.)

Alpine meadow (Log.).

(Arctic-)boreal circumpolar, alpine: w. coast of Hudson Bay, n. Lab., and Nfld., southw. in the mts. to Gaspe; Greenland; Iceland; arctic and alpine Eurasia.

6. **L. multiflora** Lej. [Hs] (*L. campestris*, var. *multiflora* (Ehrh.) Celak.)

Fields, meadows, and open woods (Bic; Rim.; Cap Chat; Pén.; Gpe.; Dou.; Cha.; Oie; GCa.); river gravels (Yrk.).

Boreal circumpolar: Aleutian Is., Alaska to Lab. and Nfld., southw. to Calif., N. Mex., and N.J.; Greenland; Iceland; Faeroes; Eurasia.

6a. **L multiflora,** var. **acadiensis** Fernald. (*L. campestris,* var. *acadiensis* Fernald, Rhod. 19: 38. 1917.)

Sterile meadow (Dou.).

(Boreal-)temperate eastern American: N.B., P.E.I., N.S., and Nfld., southw. to Gaspe and se. Me.

Two varieties of *L. campestris* have also been reported from Gaspe. These are var. *comosa* (Mey.) Fern. and Wieg. (collected at Douglastown) and var. *pallescens* Wahl. (collected at New Richmond and Maria) (*See* Rhod. 15: 40. 1913). They are separated from the species chiefly on the basis of length of perianth, a variable characteristic, and their final disposition requires further study.

21. LILIACEAE

(Lily Family)

[Marie-Victorin: Les Liliiflores du Québec; Contrib. Lab. Bot. Univ. Montréal, No. 14: 1-202. 1929.]

- a. Fruit a berry; flowers not yellow (except *Clintonia*).
  - b. Stem-leaves 3, in a single involucre-like whorl........................1. *Trillium*
  - b. Stem-leaves alternate or none.
    - c. Leaves all basal; flowers yellow; berry ovoid, blue..................2. *Clintonia*
    - c. Stems leafy.
      - d. Flowers 4-parted; leaves 2 or 3...........................3. *Maianthemum*
      - d. Flowers 6-parted or lobed; leaves more numerous.
        - e. Perianth gamophyllous, cylindrical, 6-lobed at the apex......4. *Polygonatum*
        - e. Perianth of separate parts.
          - f. Flowers white, in a terminal raceme or panicle................5. *Smilacina*
          - f. Flowers white, rose, or dark purple, axillary................6. *Streptopus*
- a. Fruit a capsule; flowers yellow or greenish (except *Allium*).
  - b. Style single, entire or more or less deeply parted.
    - c. Style 3-parted to below the middle; leaves sessile, glaucous beneath...7. *Uvularia*
    - c. Style entire or slightly 3-lobed at the summit.
      - d. Bulb solid; leaves 2, basal, mottled; flower single, the perianth-segments golden-yellow. ....8. *Erythronium*
      - d. Bulb scaly; stem leafy; flowers yellow or orange, usually spotted with brown ....9. *Lilium*
      - d. Bulb with concentric layers; leaves basal, awl-shaped, hollow; flowers small, rose-purple, many in a globular capitate umbel......................10. *Allium*
  - b. Styles 3, distinct to the base.
    - c. Anthers 2-celled; leaves very narrow, basal.......................11. *Tofieldia*
    - c. Anthers 1-celled; leaves large; stem pubescent.....................12. *Veratrum*
    - c. Anthers 1-celled; leaves narrow; stem glabrous; perianth-segments glandular at the base..13. *Zygadenus*

1. TRILLIUM L.

- a. Leaves sessile; stigmas short, stout, tapering from the base to the apex, recurved at the tip.
  - b. Petals white, cream, or pinkish; peduncles recurved or reflexed under the leaves; fruit purple..1. *T. cernuum*
  - b. Petals dark red, the fruit of the same colour; peduncles erect or spreading; flowers ill-scented; anther connectives violet-colour, opaque..................2. *T. erectum*
- a. Leaves distinctly petioled; stigmas slender and of uniform diameter, erect or spreading; petals undulate, white with purple stripes at the base.....3. *T. undulatum*

1. **T. cernuum** L. [Grh] Nodding Trillium

Rich woods (Bic; Rim.; Irn.; Ann.; Prr.; Lou.; Val.; Pcé.; Drt.; Yrk.; Gnd.; GCa.; Mat.); river alluvium (Nou.).

Boreal American: Man., James Bay, e. Que., and Nfld., southw. to Mo. and Ga.

2. **T. erectum** L. [Grh] Purple Trillium

Rich woods (Sacré-Cœur; Rim.; Marsouins; Baie des Chaleurs); river alluvium (Nou.).

Temperate eastern American: Ont. to e. Que., southw. to Tenn. and Pa., and in the mts. to N.C.

Forma *pallidandrum* Victorin & Rousseau, with anther connectives yellow and transparent, has been collected in the woods at Rimouski, the type station (*See* Contrib. Inst. Bot. Univ. Montréal, No. 36: 66. 1940).

3. **T. undulatum** Willd. [Grh] Painted Trillium

Rich woods (Bic; Rim.; St. Léandre; La Rédemption; Cap à l'Enfer; Gpe.; Pcé.; Bon.; GCa.).

Temperate eastern American: Wis. and Ont. to e. Que., southw. to Pa. and Conn., and in the mts. to Ga.

2. Clintonia Raf.
(Yellow Clintonia. Bluebead)

1. **C. borealis** (Ait.) Raf. [Grh]

Conifer woods (Bic; Drt.; Amqui). General in its habitat.

Boreal American: Man. to Lab. and Nfld., southw. to Wis. and in the mts. to N.C.

Forma *lateralis* Peck, with the scape bearing on the side 1-2 supplementary umbels of 2-5 flowers, often with an extra leaf towards the base, has been collected at St. Vianney, Matapedia co.

3. Maianthemum Weber
(Wild Lily-of-the-Valley)

1. **M. canadense** Desf. [Hpr]

Conifer woods (Bic; Mét.; Bon. I.; Amqui); maple woods (Rim.); subalpine woods (Alb.). General in its habitat.

Boreal eastern American: e. Ont. to s. Lab. and Nfld., southw. to Tenn. and N.C.; replaced in western N.A. by the pubescent var. *interius* Fernald, Rhod. 16: 211. 1914.

Forma *trifolium* (Farwell) Victorin, with 3-4 cauline leaves, has been collected on Mont Blanc, Matane co.

4. Polygonatum (Tourn.) Hill
(Solomon's Seal)

1. **P. pubescens** (Willd.) Pursh. [Grh] (*P. biflorum* of Gray's Man., ed. 7.)

Woods (Rim.).

Temperate eastern American: Ont. and Mich. to e. Que., southw. to Tex. and Fla.

5. SMILACINA Desf.

(False Solomon's Seal)

a. Flowers paniculate, numerous, minute; rootstock stout; leaves large, elliptic-oval, 3·5-7 cm. wide, abruptly acuminate, contracted at base................1. *S. racemosa*

a. Flowers racemose, fewer; rootstock rather slender.
  b. Leaves 7-12, broad and subclasping at the base, lanceolate, acute or obtusish, very glaucous; perianth-segments 3-4 mm. long.
    c. Stem 5-40 cm. long, glabrous; leaves firm, ascending, the upper somewhat reduced and enclosing the raceme..................................2. *S. stellata*
    c. Stem short, pubescent especially towards the top; leaves thin, approximate, imbricated, spreading, the upper not reduced, free from the inflorescence........ ....2a. *S. stellata*, var. *sylvatica*
  b. Leaves 2-4, narrowed at base, elliptical, acuminate, not glaucous; perianth-segments 4-5 mm. long...3. *S. trifolia*

1. **S. racemosa** (L.) Desf. [Grh]

Woods (St. Simon; St. Valérien; St. François; Mat.); maple woods (Sacré-Cœur); inland cliffs (Tra.).

Boreal American: Alaska to e. Que., southw. to Ariz., Colo., Mo., Tenn., and Ga.

2. **S. stellata** (L.) Desf. [Grh]

Calcicole: sea cliffs and talus (Bic; Gro.; Prr.; For.; Pcé.); river ledges and gravels (Rim.; Mtn.; Cap Chat; Ann.; Drt.; Gnd.; Bon.; PCa.; GCa.; Pab.; Mat.).

Psammophilous halophyte: sea beach (Bic; Pén.; Car.).

Boreal circumpolar: Alaska, Yukon, Mack. (Great Bear L.), James Bay, Lab., and Nfld., southw. to Calif., Kans., Ky., and Va.; Eurasia.

2a. **S. stellata,** var. **sylvatica** Victorin & Rousseau, Contrib. Inst. Bot. Univ. Montréal, No. 36: 66. 1940.

Thick woods near river (PCa.) (type station).

Local endemic.

3. **S. trifolia** (L.) Desf. [Grh]

Swampy soil (Bic; R. Blanche; Drt.; Gnd.; Bon.; Car.; Sayabec); alpine pond edge (Tbl.); alpine bog (Alb.).

Boreal American: B.C. and Mack. to James Bay, Lab., and Nfld., southw. to Mich. and N.J.; e. Asia.

6. STREPTOPUS Michx.

(Twisted Stalk)

a. Leaves more or less clasping, more or less glaucous or pale beneath; style entire or subentire; fruit somewhat elongated.
  b. Divisions of the perianth greenish white; fruit scarlet.......................... ....1. *S. amplexifolius*, var. *americanus*
  b. Divisions of the perianth dark purple; fruit a cherry-red colour................ ....1a. *S. amplexifolius*, var. *oreopolus*

a. Leaves sessile, green on both faces; stems branching, flexuous; stigma 3-cleft; flowers rose-purple; fruit globular or subglobular......2. *S. roseus*, var. *perspectus*

1. **S. amplexifolius** (L.) DC., var. **americanus** Schultes. [Grh] (*S. amplexifolius* of Gray's Man., ed. 7; *See* Fassett, Rhod. 37: 92. 1935.)

Conifer woods (Bic; Rim.; Irn.; Prr.; Drt.; Oie; God.; Mat.); subalpine conifer woods (Alb.; Tbl.; Str.; Lyl.). General in its habitat.

Boreal American: Alaska and Yukon to Wash., and in the mts. to Ariz. and N. Mex.; Manitoba (Porcupine Mt.); Great Lakes region, s. James Bay, Mingan Is., middle coast of Lab., Nfld., southw. to N.Y., and in the mts. to N.C.; s. Greenland; e. Asia; the whole species boreal ?circumpolar.

1a. **S. amplexifolius,** var. **oreopolus** (Fernald) Fassett. (*S. oreopolus* Fernald, Rhod. 8: 70. 1906; *See* Fernald, Rhod. 9: 107. 1907; Fassett, Rhod. 37: 99-102. 1935.)

Alpine meadows and open escarpments (Alb. (type station); Tbl.; Log.).

(Boreal-)temperate eastern American, alpine: Mingan Is. to Nfld., and in the mts. of Gaspe, N.H., and Me.

2. **S. roseus** Michx., var. **perspectus** Fassett, Rhod. 37: 109-110. 1935. [Grh]

Conifer woods (Bic; Rim.; Cap.; Cap Chat; Manche d'Epée; Val.; Drt.); subalpine conifer woods (Alb.); turfy alpine slopes (Ftn.). General in its habitat.

Boreal eastern American: s. Ont. and central Mich. to s. Lab. and Nfld., southw. to w. Pa. and n. N.J., and in the mts. to Va., Tenn., N.C., and Ga.; the whole species boreal American (gap in continental western N.A.).

7. UVULARIA L.

(Bellwort)

1. **U. sessilifolia** L. [Grh]

Woods (Mat.).

Temperate eastern American: Minn. to e. Que., southw. to Ark. and Ga.

8. ERYTHRONIUM L.

(Dog's-tooth Violet)

1. **E. americanum** Ker-Gawl. [Gb]

Woods (St. Valérien; Ste. Arsène; Sacré-Cœur; Rim.; St. André; Ste. Angèle; Res.; Mat.).

Temperate eastern American: Minn. to e. Que., southw. to Tex. and Fla.

Forma *Bachii* (Farwell) Dole, with anthers and base of perianth-segments purplish brown, has been collected in rich woods at Rimouski and Métis.

9. LILIUM (Tourn.) L.

a. Leaves mostly verticillate, not bulbiferous in the axils; perianth-divisions recurved-spreading above, yellow or orange, usually spotted with brown; native plant..1. *L. canadense*

a. Leaves alternate, bulbiferous in the upper axils; perianth-divisions strongly revolute from the base, orange-red, spotted with purple; stem white-pubescent above; plants escaped from cultivation..2. *L. tigrinum*

1. **L. canadense** L. [Gb] Canada Lily. Wild Yellow Lily

Meadows by river (Bic; PCa.; Mat.).

Temperate eastern American: Minn. to e. Que., southw. to Mo. and Ga.

2. L. TIGRINUM Ker-Gawl. [Gb] Tiger Lily

Field above beach, near garden (Pte. au Père); roadside (Bic). Native of e. Asia; widely cultivated for ornament.

10. ALLIUM (Tourn.) L.
(Wild Garlic)

a. Umbels 35-50 mm. in diameter; perianth 10-14 mm. long, rose-purple, the segments lanceolate, pointed..............................1. *A. Schoenoprasum,* var. *sibiricum*

a. Umbels 25-30 mm. in diameter; perianth 8-10 mm. long, intensely coloured, the segments ovate to ovate-lanceolate........1a. *A. Schoenoprasum,* var. *laurentianum*

1. **A. Schoenoprasum** L., var. **sibiricum** (L.) Hartm. [Gb]

Calcicole: sea cliffs (Bic; Bon. I.; New Richmond); river ledges and gravels (Ann.; Lou.; Drt.; Yrk.; Jhn.; Gnd.; Bon.; PCa.; GCa.; Mat.).

Boreal circumpolar: Alaska, Yukon, Mack. (Great Bear L.), James Bay, Lab., and Nfld., southw. to Oreg., Colo., the Great Lakes region, and N.Y.; Eurasia.

1a. **A. Schoenoprasum,** var. **laurentianum** Fernald, Rhod. 28: 167. 1926.

Calcicole: river ledges and gravels (Bon.; Res.).

(Boreal-)temperate American: Wash. to w. Nfld., southw. to Oreg., Mont., and N.Y.

11. TOFIELDIA Huds.
(False Asphodel)

a. Plant glabrous; pedicels solitary; seeds not appendaged..............1. *T. pusilla*

a. Plant pubescent and glutinous; pedicels in 3's; seeds caudate........2. *T. glutinosa*

1. **T. pusilla** (Michx.) Persoon. [Hr] (*T. palustris* of Gray's Man., ed. 7; *T. minima* (Hill) Druce; *T. borealis* Wahl.)

Calcicole: turfy calcareous alpine slopes (Tbl.); moist rocks (Log.).

Arctic circumpolar, alpine: Alaska, Yukon, Coronation Gulf, Keewatin, Baffin, n. Hudson Bay, n. Lab., and Nfld., southw. to B.C., Mont., Minn., Lake Mistassini, and Gaspe; w. and e. Greenland; Iceland; Faeroes; Spitsbergen; arctic and alpine Eurasia.

2. **T. glutinosa** (Michx.) Persoon. [Grh] (*See* Hitchcock, Amer. Midland Nat. 31: 491. 1944.)

Calcicole: sea cliffs (Bic; Pcé.); inland cliffs (Mont Joli); river ledges and gravels (Gnd.; Jhn.; Bon.; Pab.; Mat.); edge of marly pond (Lac Porc-Epic, Bic.).

Boreal American: s. Alaska and Mack. (Great Bear L.) to Mingan Is., Anticosti, and Nfld., southw. to B.C., Oreg., and N.C.

12. VERATRUM (Tourn.) L.

(False Hellebore)

1. **V. viride** Ait. [Grh] Indian Poke

Sea beach above high water (Bic); gravelly bank (Mat.); fields (Mét.; Cap Chat; Lou.; Nou.; Irn.).

Temperate American: B.C., Wash., Minn., e. Que., southw. to Colo., Tenn., and Ga.; closely related to the western American *V. Eschscholtzii* A. Gray.

13. ZYGADENUS Michx.

(Zygadene)

1. **Z. glaucus** Nutt. [Gb] (*Z. chloranthus* of Gray's Man., ed. 7; *See* Fernald, Rhod. 37: 256-258. 1935.)

Calcicole: sea cliffs and talus (Bic; Mét.; R. Blanche; Cap Chat; Pte. au Père; Gro.; Trl.; Srl.; Cld.; Prr.; Plr.; Pcé.; Car.); river ledges and gravels (Gnd.).

Psammophilous halophyte: sea beach (Bic; Bon. I.; Car.).

(Boreal-)temperate eastern American: Ont. and Mich. to e. Que., Mingan Is., and Nfld., southw. to Ill. and N.Y.; the western American plant is Z. *elegans* Pursh, a closely related species.

22. IRIDACEAE

(Iris Family)

a. Leaves 0·5-2·5 cm. wide; flowers large, 10-15 cm. in diameter; style branches broad and petaloid, opposite the anthers..1. *Iris*

a. Leaves grass-like, 1-3 mm. wide; flowers smaller, 10-12 mm. in diameter; style branches filiform, alternate with the anthers......................2. *Sisyrinchium*

1. IRIS (Tourn.) L.

(Blue Flag. Fleur-de-lis)

a. Leaves glaucous, sword-shaped, 5-25 mm. wide; petals oblanceolate, half as long as the sepals; capsule stout-beaked, firm; seeds 4-6 mm. broad, flattened on the sides, the raphe not apparent....................................1. *I. versicolor*

a. Leaves bright green, 5-10 mm. wide; petals 15-20 mm. long, involute, pointed, one-quarter as long as the sepals; capsule blunt, its walls thin and elastic; seeds 2-3·5 mm. broad, with plump sides and prominent raphe............2. *I. Hookeri*

1. **I. versicolor** L. [Grh]

Swampy soil (Bic; Rim.; Mét.; Mtn.; Mad.; For.; Drt.; Yrk.; Mat.; Zén.).

Boreal American: Man. and James Bay to s. Lab. and Nfld., southw. to Ark. and Fla.

2. **I. Hookeri** Penny. [Grh] (*I. setosa,* var. *canadensis* of Gray's Man., ed. 7; *See* Fernald, Rhod. 49: 210-215. 1947.)

Calcicole: slaty fields and sea cliffs (Bic; Ann.; For.; Pcé.; Bon. I.; Newport); river gravels (Drt.; Gnd.; Nou.); swamp (Mét.).

Psammophilous halophyte: sea beach (Bic; Mad.; Pén.; Car.).

Boreal eastern American: e. Que. to Lab. and Nfld., southw. to Me.; closely related to the western American-eastern Asiatic *I. setosa* Pall.

Forma *pallidiflora* (Fern.) Fern. (Rhod. 28: 168. 1926; 49: 210. 1947), with petals and stigmas white and sepals white except for a faint bluish tinge, has been collected from the seashore at Bic. It was originally described from Newfoundland.

2. Sisyrinchium L.

(Blue-eyed Grass)

[Fernald: The Identity of Sisyrinchium angustifolium; Rhod. 48: 152-160. 1946.]

a. Plant pale green, not much if at all darkened in drying; capsules whitish brown or pale-stramineous, not becoming blackish in age....................1. *S. montanum*

a. Plant deep green, drying black or darkish; capsules green or purple-tinged, in age fuscous-brown or blackish..........................1a. *S. montanum,* var. *crebrum*

1. **S. montanum** Greene. [Hsr] (*S. septentrionale* Bicknell.)

Calcareous sea cliffs (Prr.); river gravels and alluvium (Cld.; Gnd.; Bon.; PCa.; GCa.); sandy beach (Bic); gravel spit (Car.); fields (Irn.; Zén.).

Boreal American: Mack. and n. B.C., Man., Ont., e. Que., and Nfld., southw. to s. B.C., Colo., Nebr., Iowa, Ill., Ind., and N.Y.

1a. **S. montanum,** var. **crebrum** Fernald, Rhod. 48: 159. 1946. (*S. angustifolium* of Gray's Man., ed. 7.)

Calcareous sea cliffs (Prr.; Mad.; Ren.; For.; Pcé.; Gnd.); river gravels (Mat.); sea beaches (Bic; Pas.); fields (Bic; Rim.; Clr.; Ren.; Drt.).

Boreal American: B.C. and Mack. to s. Lab. and Nfld., southw. to Utah, Minn., Mich., Pa., and Va.

23. ORCHIDACEAE

(Orchid Family)

[Ames: An enumeration of the Orchids of the United States and Canada; The American Orchid Society, 120 pp., 1924.]

a. Anthers 2, lateral on the column, with a third enlarged flattened stamen partly closing the orifice of the moccasin-shaped labellum; roots coarsely fibrous..1. *Cypripedium*

a. Anther solitary, terminating the column (the two anther-cells should not be mistaken for separate anthers); labellum flat or concave.
  b. Flowers with a slender spur at least 2 mm. long.
    c. Glands of the two pollinia convergent, contained in the same pouch over the stigma; sepals and petals rose-colour; lip white, spotted with purple; leaf solitary, basal..2. *Orchis*
    c. Glands of the two pollinia divergent, widely separated on either side of the stigma; perianth concolorous....................................3. *Habenaria*
  b. Flowers not spurred, the lip sometimes saccate.
    c. Leaves wanting; scaly saprophytes with yellowish or purplish stems; plants from coral-like rootstocks..4. *Corallorhiza*
    c. Leaves present; plants green.
      d. Perianth at least 15 mm. across; sepals and petals more or less spreading, not strongly recurved.
        e. Leaf solitary, grass-like, sheathing the scape near the base.
          f. Flowers several in a raceme, the lip uppermost; perianth not gamophyllous; floral bract solitary.............................5. *Calopogon*
          f. Flower solitary, terminal; perianth gamophyllous, gaping; floral bracts 2 ....6. *Arethusa*
        e. Leaf solitary, ovate, subcordate at base; lip saccate, bearded.....7. *Calypso*
      d. Perianth less than 15 mm. across; sepals and petals connivent or spreading.
        e. Petals joined to the upper sepal; flowers white.
          f. Lip saccate at base, devoid of basal callosities; leaves variegated...... ....8. *Goodyera*
          f. Lip not distinctly saccate, with a horn-like callosity within on each side at base; flowers spirally arranged..............................9. *Spiranthes*
        e. Petals and sepals free; flowers greenish.
          f. Leaf solitary..10. *Malaxis*
          f. Leaves 2, near middle of stem...............................11. *Listera*
          f. Leaves 2, basal...12. *Liparis*

1. CYPRIPEDIUM L.

(Lady's Slipper. Moccasin Flower)

a. Stem short; leaves 2, basal; scape terminated by a solitary bract, 1-flowered; sepals and petals greenish brown, shorter than the drooping crimson-pink lip, which is fissured in front...1. *C. acaule*

a. Stem elongated, leafy to the top, 1-3-flowered; lip not fissured.
  b. Lip white, flushed with purple; sepals and petals greenish white, broad, obtuse, shorter than or nearly equalling the lip; stem hirsute.................2. *C. reginae*
  b. Lip golden-yellow; sepals and petals acute, linear, longer than the lip; stem glandular-pubescent............................3. *C. Calceolus*, var. *parviflorum*

1. **C. acaule** Ait. [Grh] Stemless Lady's Slipper

Conifer woods (Bic Mt.); bog (Ste. Luce); subalpine conifer woods (Str.).

(Boreal-)temperate American: Mack. and Man. to s. James Bay, Mingan Is., and Nfld., southw. to Ind., Ohio, and N.J., and in the mts. to Tenn. and N.C.

2. **C. reginae** Walt. [Grh] (*C. hirsutum* of Gray's Man., ed. 7.) Showy Lady's Slipper

Calcicole: cedar swamp (Bic); river banks (Cap Chat; Gnd.; Bon.; Pab.).

(Boreal-)temperate eastern American: Minn. to Nfld., southw. to Mo. and Ga.

3. C. Calceolus L., var. **parviflorum** (Salisb.) Fernald. [Grh] (*C. parviflorum* Salisb.; *See* Rhod. 48: 4. 1946.) Yellow Lady's Slipper

Calcicole: cedar swamp (Bic; Car.); sea cliffs (Lbn.; For.; Pcé.; Bon. I.); river gravels and ledges (Gnd.; Bon.; Pab.; Mat.); swampy soil (Bic; Mét.; Gpe.); railway embankment (Bic); damp woods (Grand Lac Madeleine).

Boreal American: Yukon, Mack. (Great Bear L.) to s. Lab. and Nfld., southw. to Wash., Utah, N. Mex., Mo., Tenn., and Ga.

2. ORCHIS L.
(Orchis)

1. O. rotundifolia Pursh. [Grt]

Wooded river banks (R. Portage; Gnd.; Bon.; GCa.); swamps (Bic; Mét.; Mtn.; Val.; Car.); lake shore (Lac Madeleine).

Boreal American: Alaska, Yukon, Mack. (Mack. R. Delta, Great Bear L.), Hudson Bay (Churchill), Mingan Is., w. Nfld., southw. to B.C., the Great Lakes region, and N.Y.; s. Greenland.

3. HABENARIA Willd.
(Orchis)

a. Leaves all basal; stem a scape.
  b. Leaf solitary, obovate; scape naked..............................1. *H. obtusata*
  b. Leaves 2, oval or orbicular, spread flat on the ground.
    c. Scape bractless; flowers yellowish green; lip lanceolate, pointed, about 1 cm. long; spur slender, acute, 2 cm. long..........................2. *H. Hookeri*
    c. Scape with one or more lanceolate bracts; flowers greenish white; lip oblong-linear, obtuse, 1·5-2 cm. long; spur 1·5-2·5 cm. long............3. *H. orbiculata*

a. Leaves cauline.
  b. Leaves 1-2, oblong or oblanceolate, obtuse; lip wedge-oblong, truncate, with 3 short apical teeth or lobes; spur slender, slightly clavate..........4. *H. clavellata*
  b. Leaves more than 2.
    c. Flowers green, subtended by long divergent linear-lanceolate bracts 2-4 times their length; lip 3-toothed at the apex, longer than the spur...5. *H. viridis*, var. *bracteata*
    c. Bracts much shorter.
      d. Flowers white, fragrant; lip lanceolate, with a dilated rhomboidal base, entire..6. *H. dilatata*
      d. Flowers greenish white; lip lanceolate, not dilated at base, entire...7. *H. hyperborea*
      d. Flowers purplish; lip deeply fringed and 3-parted, spreading, 10-12 mm. broad..8. *H. psycodes*

1. H. obtusata (Pursh) Richards. [Grt]

Conifer woods (Lac à Foin; Mét.; Mad.; Ren.; GCa.; Cha.; Cap à l'Enfer; St. Vianney); swamp (Bic); cedar swamp (New Carlisle; New Richmond; Car.); subalpine conifer woods (R. du Diable, Alb.; Lac Ste. Anne, Tbl.; Lac du Vieillard, Tbl.); subalpine swamp (Alb.); alpine meadow (Tbl.).

Boreal American: Alaska, Yukon, Mack. (Mack. R. Delta, Great Bear L.), n. Hudson Bay, Lab., and Nfld., southw. to Wash., Colo., Minn., Wis., and N.Y.

2. **H. Hookeri** Torr. [Grt]

Conifer woods (Bic; Rim.; Tra.).

(Boreal-)temperate eastern American: Minn. to e. Que. and Nfld., southw. to Iowa and Pa.

3. **H. orbiculata** (Pursh) Goldie. [Grt] Large Roundleaf Orchid

Conifer woods (Bic; Rim.; Grand Lac Matane; Mét.; Ann.); subalpine conifer woods (Mtt.; Ftn.).

Boreal American: Alaska and Mack. to Lab. and Nfld., southw. to Wash., Idaho, Ill., Ohio, Pa., and Mass., and in the mts. to Ga.

4. **H. clavellata** (Michx.) Spreng. [Grt] Small Green Wood Orchid

Bog (Bic).

(Boreal-)temperate eastern American: Minn. to Nfld., southw. to La. and Fla.

5. **H. viridis** (L.) R. Br., var. **bracteata** (Muhl.) Gray. [Grt] (*H. bracteata* (Muhl.) R. Br.; *See* Fernald, Rhod. 28: 169-174. 1926.)

Woods by river (Cap Chat; Ann.); calcareous soil in maple grove (St. Alphonse); damp woods (Val Brillant); grass at mountain summit (Bln.).

(Boreal-)temperate American: B.C. to Nfld., southw. to Wash., Mont., Ill., Ohio, and N.C.; China and Japan; with the species, boreal circumpolar.

6. **H. dilatata** (Pursh) Gray. [Grt] White Bog Orchid

Calcicole: cedar swamp (Bic); river shores (Pab.; Bon.; GCa.; Mat.); swampy soil (Mét.; Mad.; Clr.; Ren.; St. Majorique; Gpe.; Pcé.; Gnd.; Oie; GCa.; Car.; Nou.; Anse à la Loutre; Zén.); calcareous alpine meadow (Tbl.); alpine meadows and swamps (Alb., Tbl.).

Boreal American: Aleutian Is., Alaska, Yukon, Mack., James Bay, Lab., and Nfld., southw. to n. Calif., Colo., S. Dak., Minn., Mich., and N.J.; w. Greenland; Iceland; e. Asia.

7. **H. hyperborea** (L.) R. Br. [Grt] Northern Green Orchid

Calcicole: damp spots below cliffs (Prr.; Lou.; Clr.; Pcé.; Tra.); river ledges and gravels (Rim.; Mtn.; R. Portage; Gnd.; Pab.; Bon.; PCa.; Res.; Mat.); cedar swamp (Bic); edge of marly ponds (Lac Porc-Epic, Bic; Oie); swamp in spruce woods (Yrk.); slaty beach above high water (Bic).

(Arctic-)boreal American: Aleutian Is., Alaska, Yukon, Mack. (Great Bear L.), Hudson Bay (Churchill), Ungava Bay, Lab., and Nfld., southw. to s. B.C., Idaho, Colo., Nebr., Minn., Ill., Ind., Pa., and N.Y.; w. and e. Greenland; Iceland; e. Asia.

8. **H. psycodes** (L.) Sw. [Grt] Purple Fringed Orchid

Wet alder thicket above salt marsh (Bic); edge of brook (Fame Point); gravelly river bank (Ren.; Mat.); wet slaty soil (Rim.); barachois (Mal.); lakeside (Lake Matapedia).

(Boreal-)temperate eastern American: Minn. to Mingan Is. and Nfld., southw. to Tenn. and N.C.

4. Corallorhiza R. Br.
(Coral Root)

a. Lip 3-lobed; sepals and petals 7-8 mm. long.
  b. Lateral lobes of lip very small; lip white, not spotted; spur very small; plant slender, greenish yellow, 4-19 cm. high, 4-12-flowered..................1. *C. trifida*
  b. Lateral lobes larger; lip white, spotted with purple; spur manifest; plant stout, purplish, 2-4 dm. high, 10-30-flowered..............................2. *C. maculata*

a. Lip entire; sepals and petals 15-18 mm. long, with 3 madder-purple nerves..........
....3. *C. striata*

1. **C. trifida** Chat. [Grh]

Conifer woods (Bic; Rim.; Mad.; Yrk.; Bon. I.; Cap à l'Enfer). General in its habitat.

(Arctic-)boreal circumpolar: Aleutian Is., Alaska, Yukon, Mack. (Mack. R. Delta, Great Bear L.), Keewatin, Hudson Str., n. Que., n. Lab., and Nfld., southw. to Wash., Colo., Nebr., Minn., Pa., and N.J., and mts. of Ga.; w. Greenland; Iceland; Eurasia. The Gaspe plants are probably all var. *verna* Fernald (*See* Rhod. 48: 193-197. 1946).

2. **C. maculata** Raf. [Grh]

Conifer woods (Bic; Rim.; Trl.; Prr.; Lou.; Mad.; Val.; Bon. I.; GCa.; Car.; Mat.). General in its habitat.

(Boreal-)temperate American: B.C. to Nfld., southw. to Calif., Ind., N.C., and Va.

3. **C. striata** Lindl. [Grh]

Conifer woods (Bic; Bon. I.); cedar woods (Pcé.).

Disjunct American: B.C. to Alb., southw. in the mts. to Calif. and Wyo.; Ont. and Minn. to e. Que., southw. to N.Y.; probably more widely distributed, since fruiting herbarium specimens closely resemble *C. maculata.* The Gaspe specimens are referable to forma *fulva* Fernald (*See* Rhod. 48: 193-197. 1946).

5. Calopogon R. Br.

1. **C. pulchellus** (Sw.) R. Br. [Gst]

Peaty swamp (Bic); bog (Ste. Luce).

(Boreal-)temperate eastern American: Minn. to Nfld., southw. to Tex. and Fla.

6. Arethusa (Gronov.) L.

1. **A. bulbosa** L. [Gst]

Peaty swamp (Bic).

Boreal eastern American: Minn. to s. Lab. and Nfld., southw. to Ind., Ohio, Pa., and N.J., and in the mts. to S.C.

7. Calypso Salisb.

1. **C. bulbosa** (L.) Oakes. [Gst] (*C. borealis* Salisb.)

Cedar swamps (Bic; Gpe.; New Richmond); river banks (Gnd.; PCa.); damp woods (Ann.; Gpe.; Pcé.; Bon.; New Carlisle).

Boreal circumpolar: Alaska, Yukon, Mack. (Great Bear L.), s. Hudson Bay, Lab., and Nfld., southw. to Calif., Ariz., Colo., Minn., Mich., and Me.; Eurasia.

8. GOODYERA R. Br.

(Rattlesnake Plantain)

a. Raceme loosely flowered; lip saccate, with an elongated tip and flaring or recurved margin; stem rarely longer than 25 cm.

  b. Flowers in a 1-sided spike 3-7 cm. long; anther short and blunt; beak of stigma shorter than the body; perianth 4-4·5 mm. long; leaves 1-3 cm. long, abruptly acuminate..1. *G. repens,* var. *ophioides*

  b. Flowers in a loose spiral 6-8 cm. long; anther acuminate; beak of stigma as long as or longer than the body; perianth 5-6 mm. long; leaves 3-8 cm. long..2. *G. tesselata*

a. Raceme densely flowered; lip scarcely saccate, elongated, with the margin involute; perianth 10-11 mm. long; spike 10-15 cm. long; stem 30-45 cm. high; leaves 5-10 cm. long...3. *G. oblongifolia*

1. **G. repens** (L.) R. Br., var. **ophioides** Fernald. [Hrr] (*Epipactis repens,* var. *ophioides* (Fern.) A. A. Eaton; *See* Fernald, Rhodora 1: 2-7. 1899.)

Conifer woods (Bic; Lac à Foin; Cap Chat; Lac Madeleine; Gpe.; Yrk.; Gnd.; Bon.; Cha.; Car.; Nou.; Mat.); subalpine conifer woods (Alb.). General in its habitat.

Boreal American: Alaska, Yukon, Mack. (Great Bear L.), s. and e. Lab., and Nfld., southw. to N. Mex., S. Dak., Mich., and N.Y., and in the mts. to S.C.; with the species, boreal circumpolar.

2. **G. tesselata** Lodd. [Hrr] (*Epipactis tesselata* (Lodd.) A. A. Eaton.)

Conifer woods (Bic; Cap Chat; Grand Lac Matane; Ann.; Mad.; Gpe.; Pcé.; Gnd.; Cha.; Tra.); subalpine conifer woods (Alb.; Tbl.; Str.).

(Boreal-) temperate eastern American: Minn. and Ont. to Nfld., southw. to Conn. and N.Y.

3. **G. oblongifolia** Raf. [Hrr] (*G. Menziesii* Lindl.; *G. decipiens* (Hook.) F. T. Hubbard; *See* Fernald, Rhod. 48: 11. 1946.)

Conifer woods (Bic; Grand Lac Matane; Cap Chat; Marsouins; Tng.; Pcé.; Cha.; Tra.); subalpine conifer woods (Alb.; Log.; Mtt.; Ftn.; Nic.).

Disjunct American: s. Alaska to Calif. and Ariz.; Great Lakes region; e. Que. to N.B. and N.Y.

9. SPIRANTHES Richard

(Ladies' Tresses)

a. Lip constricted below the apex, pandurate; callosities minute or lacking; lateral sepals upturned and connivent with the petals and the upper sepal; perianth ringent; beak of the stigma short; flowering in midsummer...............1. *S. Romanzoffiana*

a. Lip unconstricted; callosities prominent; lateral sepals not upturned, and, therefore, perianth not plainly ringent; beak of the stigma very long and slender; flowering in late summer..2. *S. cernua*

1. **S. Romanzoffiana** Cham. [Hs]

Edge of marly pond (Bic); swampy soil (Mét.; R. Blanche; Gnd.; Bon.; PCa.; New Carlisle; Car.).

Boreal American: Aleutian Is., Alaska, Yukon, Mack., s. Hudson Bay, e. Lab., and Nfld., southw. to Calif., Utah, Colo., S. Dak., Minn., Ill., and N.Y.; relic in n. Ireland and w. Scotland.

2. **S. cernua** (L.) Richard. [Hs]

Damp ground (Albertville).

(Boreal-)temperate American: Minn. to Nfld., southw. to N. Mex., Tex., and Ga.

10. MALAXIS Soland.

(Adder's Mouth)

a. Pedicels equalling or shorter than the ovaries; lip acute, unlobed; raceme long and slender; scape with a sheathing leaf near base..................1. *M. brachypoda*

a. Pedicels slender, much longer than the ovaries; lip broad and truncate at apex, 3-lobed; raceme short and thick; scape with a clasping leaf near middle...2. *M. unifolia*

1. **M. brachypoda** (Gray) Fernald. [Gst] (*Microstylis monophyllos* of Gray's Man., ed. 7.)

Calcicole: sea cliffs (Bic; Ann.; Srl.); river gravels (PCa.).

Boreal eastern American: Man., Great Lakes region, s. Lab., and Nfld., southw. to Colo., Ind., and Pa.; closely related to the Eurasian-western American *Microstylis monophyllos* (L.) Lindl.

2. **M. unifolia** Michx. [Gst] (*Microstylis unifolia* (Michx.) BSP.)

Conifer woods (Bic; R. Blanche; Pcé.; Gnd.; Bon.; New Carlisle; Car.; Nou.).

(Boreal-)temperate American: Sask. to Nfld., southw. to Mo. and Fla.

11. LISTERA R. Br.

(Twayblade)

a. Sepals and petals scarcely 2 mm. long; lip brownish red, with 2 divergent filiform lobes and a tooth on each side at base...............................1. *L. cordata*

a. Sepals and petals longer; lip broad, slightly 2-cleft at the apex.
  - b. Lip 9-11 mm. long, cuneate, with a mucro in the sinus, not auriculate, but with a short triangular tooth on each side at base..................2. *L. convallarioides*
  - b. Lip 6-8 mm. long, without a mucro in the sinus, auriculate at base...3. *L. auriculata*

1. **L. cordata** (L.) R.Br. [Grh] Heartleaf Twayblade

Conifer woods (Bic; Ann.; Mad.; Tng.; Yrk.; Bon. I.; Gnd.; GCa.; Car.; Nou.); subalpine conifer woods (Alb.; Tbl.; Log.; Str.); alpine meadow (Tbl.). General in its habitat.

Boreal circumpolar: Aleutian Is., Alaska, Yukon, James Bay, Lab., and Nfld., southw. to Calif., Minn., Mich., and N.J.; w. and e. Greenland; Iceland; Faeroes; Eurasia.

2. **L. convallarioides** (Sw.) Torr. [Grh] Large Twayblade

Shaded sea cliffs (Trl.; Srl.; Clr.; Pcé.); alluvial river bank (Ann.); cedar swamp (Bic); woods (Bic; Mad.; Tng.; Pcé.; Irn.); alpine hornblende schists (Alb.).

Boreal American: Aleutian Is., Alaska, Man., Ont., Mingan Is., and Nfld., southw. to Calif., Minn., and N.Y.

3. **L. auriculata** Wiegand. [Grh]

River gravels and wooded banks (R. Cap Chat; Ann.; Trl.; Drt.; Dou.; Pcé.; Gnd.; Bon.; PCa.; GCa.).

Disjunct American: B.C.; Great Lakes region; e. Que. and Nfld. to N.H. and Vt.

12. LIPARIS Richard

(Twayblade)

1. **L. Loeselii** (L.) Richard. [Hr]

Calcareous shingle beach (Lac Porc-Epic, Bic); meadows (Bon.; New Richmond; Nou.); cedar swamp (Car.).

Temperate American: Sask. to e. Que., southw. to Mo., Ala., and N.C.

Class II. **DICOTYLEDONEAE**

24. SALICACEAE

(Willow Family)

a. Disk beneath each flower cup-shaped; stamens numerous; scales lacerate; leaves ovate or deltoid; winter bud-scales several..............................1. *Populus*

a. Disk consisting of 1-several finger-shaped or forked nectaries; stamens 2-3; scales entire or merely toothed; winter bud-scale solitary........................2. *Salix*

1. POPULUS (Tourn.) L.

(Poplar. Aspen)

a. Petioles terete, scarcely flattened laterally; leaves pale and russet-streaked beneath; buds large, varnished with a copious fragrant resin; styles dilated; capsules large.. ....1. *P. balsamifera*

a. Petioles strongly flattened laterally; styles linear; capsules 1-3 mm. in diameter, narrowly conic.

- b. Leaves coarsely undulate-dentate, tomentose when young; buds, young twigs, and capsules puberulent or downy, dull; scales with 5-6 unequal small divisions...... ....2. *P. grandidentata*
- b. Leaves crenate-serrulate, glabrous when young; buds, twigs, and capsules glabrous, often shining; scales cut into 3-4 deep linear divisions..................... ....3. *P. tremuloides*

1. **P. balsamifera** L. [N-MM] (*P. tacamahacca* Mill.; *See* Rouleau, Rhod. 48: 103-110. 1946.) Balsam Poplar. Tacamahac

Pioneer shrub on sea cliffs and talus slopes (Bic; Prr.; Lbn.); pioneer shrub on river ledges and gravels (Mtn.; Drt.; Jhn.; Bon.; PCa.; GCa.; Mat.); woods by subalpine lake (Lac Ste. Anne, Tbl.); alpine slopes (Alb.).

(Arctic-)boreal American: Alaska, Yukon, Mack., s. Hudson Bay, n. Lab., and Nfld., southw. to Nev., Colo., Texas, and Fla.

2. **P. grandidentata** Michx. [MM] Large-toothed Aspen

Dry and rocky hillside (Montagne Ronde, St. Valérien, Rimouski co.).

Temperate eastern American: Minn. to e. Que., southw. to Iowa and Ill., and in the mts. to N.C.

3. P. tremuloides Michx. [MM] Trembling Poplar. Aspen

Woodlands (Bic; Ste. Luce; Fla.; Mét.; Prr.; Drt.; Yrk.; Bon.; PCa.). General.

Boreal American: Alaska, Yukon, Mack., James Bay, s. Lab., and Nfld., southw. to Nebr., Mo., and Tenn., and in the mts. to Calif. and Mex.

Forma *nana* Cockerell, a depressed shrub branched from the base and with red petioles, has been collected from sea cliffs at Mont St. Pierre and from river ledges at Rimouski.

Several varieties, based chiefly on leaf characteristics, are described by Marie-Victorin (Contrib. Lab. Bot. Univ. Montréal, No. 16). Of these, var. *intermedia, rhomboidea,* and *magnifica* have been reported from our area.

2. SALIX (Tourn.) L.

(Willow)

[Schneider: Notes on American Willows; Bot. Gaz. 66: 117-142, 318-353. 1918; 67: 27-64, 309-346. 1919; Journ. Arnold Arb. 1: 1-32, 67-97. 1919; 1: 147-171, 211-232. 1920; 2: 1-25, 65-90. 1920; 2: 185-204. 1921; 3: 61-125. 1921 (contains systematic enumeration, key, and index). Raup: The willows of the Hudson Bay region and the Labrador Peninsula; Sargentia 4: 81-127 and plates 1-4. 1943.]

- a. Trees or large shrubs, mostly more than 1 m. high.
  - b. Capsule glabrous.
    - c. Bracts of the pistillate flowers pale or yellow, without dark tips, not persistent in fruit; nectaries 2; filaments hairy; catkins terminal on leafy lateral branches, appearing with or after the leaves.
      - d. Stigma sessile or subsessile; mature pedicels 1-3 mm. long; stamens 2; leaves sessile or subsessile, linear, short-acuminate, with 2-3 projecting teeth to each cm. of margin..1. *S. interior*
      - d. Style distinct, 0·5-1 mm. long; stamens 3-7; petioles provided towards the upper end with distinct, often irregularly lobulate glands; leaves lanceolate to ovate-lanceolate, with long-acuminate curved tips.
        - e. Leaves more or less broadly ovate- or elliptic-lanceolate, rather abruptly caudate-acuminate.
          - f. Young branchlets and leaves glabrous or quickly glabrescent....2. *S. lucida*
          - f. Young branchlets and under surface of the leaves permanently pubescent with a dirty grey or reddish pubescence........2a. *S. lucida,* var. *intonsa*
        - e. Leaves more or less narrowly lanceolate, rather gradually acuminate........ ....2b. *S. lucida,* var. *angustifolia*
    - c. Bracts of the pistillate flowers brownish, tawny, or blackish, at least at tips, persistent; stamens 2, the filaments glabrous; aments appearing before or with the leaves; pedicels distinct; styles (and stigmas) short; mature leaves glabrous, or essentially so.
      - d. Bracts uniformly coloured; aments coetaneous, even the flowering ones borne on leafy peduncles; leaves giving off a balsamic odour, even long after they are dried, grandular-crenate-serrate all around, very often cordate at base, broadly ovate, elliptic or elliptic-oblong, at first very thin, subpellucid and reddish, at length firm but thin, prominently reticulate-veined beneath....3. *S. pyrifolia*
      - d. Bracts of two colours, fuscescent for the most part or at the apex; flowering aments subsessile on the branchlets.
        - e. Styles 1-1·25 mm. long; capsules 9-10 mm. long; mature aments 8 cm. long, 2 cm. broad; leaves oblong or lanceolate, blackening in drying, bright green above, glaucous-whitened beneath, the margin closely crenate with gland-tipped teeth..................................4. *S. glaucophylloides*
        - e. Styles, capsules, and aments shorter; leaves oblong-lanceolate or narrower, on vigorous shoots mostly rounded, cordate or truncate at base, not blackening in drying, the upper surface rather dull green, the lower only slightly paler, the margins sharply serrulate; stipules large, persistent, reniform, or ovate.

f. Branchlets and young leaves heavily villous, the pubescence inclined to persist on the mature foliage..............................5. *S. cordata*

f. Branchlets, petioles, and leaves glabrous to glabrate..5a. *S. cordata*, var. *abrasa*

b. Capsules tomentose or silky.

c. Pedicels distinct, even at anthesis 2-6 times as long as the nectaries.

d. Bracts uniformly coloured; aments coetaneous; style none or very short, not longer than the short-oblong stigmas; leaves slender-petioled, ovate-lanceolate, glabrescent to villous-tomentose..........................6. *S. Bebbiana*

d. Bracts of two colours, fuscescent for the most part or toward the apex; aments often precocious.

e. Stigmas rather long, 4-5 times longer than thick, mostly 1-1·5(-2) mm. long, longer than the styles, which are often obsolete; capsules 7-14 mm. long; pedicels 1-3·5 mm. long; leaves irregularly crenate-serrate; large shrubs of low, wet ground.

f. Leaves lanceolate to elliptic, more than 3-3·5 times longer than broad ....7. *S. discolor*

f. Leaves broader, obovate or broadly oval, mostly 3-3·5 times longer than broad or less...................................7a. *S. discolor*, var. *Overi*

e. Stigmas short-oblong, scarcely over 3 times longer than thick, usually less than 1 mm. long; styles evident, about as long as the stigmas; capsules usually shorter than in the last.

f. Leaves, including the young ones, lanceolate to elliptic or oblanceolate, usually 3·5-4 or more times longer than broad, soon glabrate..8. *S. humilis*

f. Young leaves broader, more nearly rounded, the mature ones rather broadly obovate and commonly tomentose..8a. *S. humilis*, var. *keweenawensis*

c. Pedicels none or short, even in fruit scarcely more than twice as long as the nectaries.

d. Flowering twigs more or less distinctly hoary; aments precocious; leaves lance-linear to oblanceolate, with distinctly lustrous silvery-velvety pubescence beneath..9. *S. pellita*

d. Flowering twigs not hoary, or if so the leaves glabrous; pubescence of the leaves if present dull or silvery-silky; bracts of two colours, fuscous in large part or at least towards the apex.

e. Twigs, even the flowering ones, more or less tomentulose, more densely pilose when young.

f. Aments, even in fruit, hardly over 5:1·5 cm.; ovaries covered with a dense subfloccose tomentum; leaves linear-lanceolate, rather rigid, with revolute margins, more or less rugose above.

g. Leaves, even when mature, densely subfloccose- or subfarinaceous-tomentose..10. *S. candida*

g. Leaves glabrescent or almost glabrous when mature...10a. *S. candida*, var. *denudata*

f. Aments, even in flower, mostly over 4 cm. long, in fruit up to 7-13 cm., the pubescence not at all farinaceous; leaves large (up to 20 cm. long), crenate, glabrescent beneath; capsule 6-7 mm. long; styles 0·5-1 mm. long...11. *S. laurentiana*

e. Flowering twigs, and often even the young ones, glabrous, or ashy-pilose when young and soon glabrate; capsules very short, 3·5-4 mm. long; leaves oblanceolate or oblanceolate-oblong, crenate-dentate........12. *S. paraleuca*

a. Low or depressed, mainly arctic, subarctic and alpine shrubs mostly less than 1 m. high.

b. Pistillate flowers with 2 glands, ventral and dorsal to the pedicel; capsules 5-7 mm. long, sessile, densely silky-tomentose; style very short or none; aments few-flowered, subterminal; leaves obovate, thick, mostly retuse or emarginate at apex, dark green and glabrous above, reticulate-veined.

c. Leaves permanently silky-tomentose beneath; staminate catkin 1-1·5 cm. long...13. *S. vestita*

c. Leaves glabrescent beneath; staminate catkin 1·7-2·5 cm. long...13a. *S. vestita*, var. *psilophylla*

b. Pistillate flowers with only 1 gland, ventral to the pedicel; repent or upright shrubs.

c. Low prostrate shrubs with rooting branches, or very small suffruticose plants; leaves mostly well developed at anthesis.

d. Ovaries and pedicels glabrous even when young; leaves crenate-dentate or glandular-crenate-denticulate.

e. Leaves of the same colour on both sides, green, 1-3 cm. long, smooth and shining, crenate-dentate, nearly orbicular, rounded or cordate at base; aments terminating 2-leaved branchlets, small, ovoid, 4-10-flowered; bracts yellowish or violet, sparingly short-pilose; small matted plants 2-15 cm. high..........14. *S. herbacea*

e. Leaves distinctly paler beneath, deep green and shining above, 0·8-2 cm. long, firm, glandular-crenate-denticulate, the mature ones marcescent, partly long-persistent, obovate or oblong; aments 2-3 cm. long, cylindric, densely flowered; bracts rose-red at tip, silky-pilose; plant closely prostrate, spreading from a stout central root..........15. *S. Uva-ursi*

d. Ovaries more or less densely pilose (sometimes only in part or only the pedicels), the capsules sometimes glabrescent; leaves entire or at most inconspicuously glandular-denticulate or crenate; bracts of 2 colours, fuscous at the apex.

e. Ventral glands rather short and broad, scarcely twice as long as thick, broadly truncate at the apex, half as long as the pedicel; aments prominent, reddish, upright; capsule 6·5-8 mm. long; leaves conspicuously shiny-varnished above, denticulate..........16. *S. arctophila*

e. Glands oblong, mostly 2½-4 times longer than thick, usually exceeding the pedicels.

f. Leaves broadly ovate, ovate-rounded, obovate, broadly elliptic to orbicular, rounded or rather short-acute at the apex, broadly cuneate or rounded to subcordate at the base..........17. *S. arctica*, var. *kophophylla*

f. Leaves distinctly obovate; pedicels scarcely exceeding the distinctly pubescent dark bracts; nectary long-subulate, half as long as the very short thickish pedicel..........18. *S. hebecarpa*

c. Erect or arborescent shrubs, with branches never repent or rooting (though many species are of very low and spreading form); aments usually appearing with or before the leaves.

d. Ovaries and pedicels glabrous even when young.

e. Pedicels distinct, even at anthesis 2-6 times as long as the glands; styles (and stigmas) short.

f. Bracts uniformly coloured, yellowish; aments coetaneous, even the flowering ones borne on leafy peduncles; capsules rather obtusely conic, 5-8 mm. long; stigma sessile; leaves entire, green above, glaucous beneath, obovate-oblong or broadly oblanceolate........19. *S. pedicellaris*, var. *hypoglauca*

f. Bracts of two colours, fuscescent for the most part or at the apex; flowering aments subsessile on the branchlets; style minute.

g. Leaves oblong to suborbicular, 2-5 cm. long, closely dentate-serrate, bright green above, slightly glaucous beneath; aments 0·5-2 cm. long; capsules 2-3 mm. long..........20. *S. obtusata*

g. Leaves obovate, oblanceolate or oval, 1-3 cm. long, finely crenate; aments 1-3 cm. long; capsules 4-5 mm. long.

h. Leaves green on both sides or merely a little paler beneath; capsules more or less pedicelled, slenderly conic-subulate; scales brownish or fuscous..........21. *S. myrtillifolia*

h. Leaves conspicuously whitened beneath; capsules sessile or subsessile, conic-ovoid; scales black......21a. *S. myrtillifolia*, var. *brachypoda*

e. Pedicels none or short, even in fruit not more than twice as long as the glands; styles (and stigmas) elongated.

f. Bracts green, glabrous or somewhat ciliate, large and herbaceous; fertile aments 5-13 mm. long; leaves lanceolate to elliptic-oblong to narrowly obovate, green above, glaucous to arachnoid beneath, later glabrate, entire, 1-2·5 cm. long, 4-14 mm. broad, short-petioled..........22. *S. chlorolepis*

f. Bracts dark brown, silky-villous; fertile aments 6-8·5 cm. long; leaves almost orbicular, apiculate, often cordate at the base, short-petioled, entire, less than 2·5 cm. long and broad; winter buds 5-10 mm. thick, hairy..23. *S. calcicola*

d. Ovaries (rarely only the pedicels or the base of the ovaries) pilose.

e. Pedicels distinct, even at anthesis 2-6 times as long as the glands; bracts yellowish; aments coetaneous.

f. Styles none or very short; capsule grey-pubescent, its pedicel several times exceeding the subtending bract; leaves strongly rugose in age, greyish-pubescent or glabrate beneath............................6. *S. Bebbiana*

f. Styles elongate; capsule densely silvery-silky, its pedicel scarcely exceeding subtending bract; leaves scarcely rugose, silvery-silky beneath...24. *S. argyrocarpa*

e. Pedicels none or short, even in fruit scarcely more than twice as long as the glands.

f. Bracts of the flowers uniformly coloured, yellowish straw-coloured or yellowish brown.

g. Petioles very short, mostly 1-2 mm. long, not exceeding well-developed buds; stipules about equalling or twice as long as the petioles.

h. Shrub up to 1 m. high; leaves oblong to broadly elliptic, 2-5 cm. long; aments peduncled and elongated.

Leaves grey-pubescent above and whitish silky-villous beneath, except some of the smaller ones which are glabrate above; twigs of the year more or less densely greyish-silky-villous..........25. *S. brachycarpa*

Leaves glabrescent when mature, even beneath; twigs of the year glabrescent.......................25a. *S. brachycarpa*, var. *antimima*

h. Low shrub 2-5(-7) dm. high; leaves elliptic-ovate or obovate, 1-2(-2·5) cm. long; aments subsessile, nearly globular...25b. *S. brachycarpa*, var. *Sansoni*

g. Petioles well developed, longer than the buds or stipules.

h. New branchlets and young leaves more or less densely villous or silky.

i. Mature leaves mostly 2·5-6 cm. long, oblanceolate, oblong, elliptic, or narrowly obovate.

Leaves glabrate in maturity or merely a little silky on the nerves beneath.......................26. *S. cordifolia*, var. *callicarpaea*

Leaves permanently and rather densely villous...26a. *S. cordifolia*, var. *intonsa*

i. Mature leaves mostly only 1-2·5 cm. long, elliptic, oblong, or narrowly obovate.................26b. *S. cordifolia*, var. *Macounii*

h. New branchlets and young leaves glabrous or essentially so; leaves obovate, 2-5 cm. broad.................26c. *S. cordifolia*, var. *tonsa*

f. Floral bracts of two colours, fuscous in large part or at least towards the apex; capsules tomentose, 5-6 mm. long; aments sessile or nearly so, with a few short bracts at the base; leaves elliptic-lanceolate to oblong, minutely repand-crenulate or entire, very smooth on both sides, dark green and shining above, glaucous beneath.............27. *S. planifolia*

1. **S. interior** Rowlee. [(N-)M] (*S. longifolia* Muhl.)

River gravels (Res.).

Boreal American: Yukon, Man., James Bay to e. Que., southw. to N. Mex., Tex., La., Ohio, and Va.

Forma *Wheeleri* (Rowlee) Rouleau, with leaves white-silky on both sides, capsules pubescent, and young twigs appressed-silky with white hairs, is the type represented in the above collection.

2. **S. lucida** Muhl. [(N-)M] Shining Willow

River ledges and gravels (Rim.; Mat.); wet places (Rim.; Pte. au Père; Drt.).

Boreal American: N. W. Terr., James Bay, Lab., and Nfld., southw. to Nebr., Ky., and N.J.

2a. **S. lucida,** var. **intonsa** Fernald.

Wet places (St. Valérien; R. Blanche; Ann.; Tng.; Gnd.; Bon.; PCa.; Nou.; Mat.). General in its habitat.

Boreal eastern American: Que. to s. Lab. and Nfld., southw. to Ind. and N.J.

2b. **S. lucida,** var. **angustifolia** Anderss.

River gravels (Gnd.; Jhn.; Bon.; PCa.; Mat.); meadows and swamps (Bic); cedar swamp (Car.).

Boreal eastern American: Ont., Que., Lab., and Nfld.

3. **S. pyrifolia** Anderss. [N-M] (*S. balsamifera* Barratt.) Balsam Willow

Swampy soil (Bic; Mét.; Bon.; Albertville); wet alpine soil (Tbl.).

Boreal American: Alaska and Mack. to James Bay, Lab., and Nfld., southw. to Mont., Minn., and N.Y.

4. **S. glaucophylloides** Fernald, Rhod. 16: 173. 1914. [(N-)M] (*S. glaucophylla* of Gray's Man., ed. 7, in part.) Blueleaf Willow

Calcicole: sea cliffs and talus (Bic; Gro.; Srl.; Prr.); river ledges and gravels (Mtn.; Cap Chat; Ann.; Drt.; Jhn.; Gnd.; Pab.; Dan.; Bon.; PCa.; Nou.; Mat.; Res.); lake shore (Lac Pleureuse).

Psammophilous halophyte: sea beach (Mtn.; Méchins; Cap Chat).

(Boreal-)temperate eastern American: n. Ont. to Nfld., southw. to N.B. and Me.

Forma *lasioclada* Fernald, with densely grey-velvety branchlets (Rhod. 48: 45. 1946), has been collected with the typical form at several stations (R. Cap Chat; Méchins; Prr.; Bon.).

5. **S. cordata** Michx. [(N-)M] (*S. adenophylla* Hook.; *See* Fernald, Rhod. 48: 31-33. 1946.) Heartleaf Willow

River banks and wet places (Bic; Rim.; Mtn.; Ann.; Bnc.; Gnd.; Bon.; PCa.; New Richmond; Mat.). General in its habitat.

(Boreal-)temperate eastern American: James Bay to s. Lab. and Nfld., southw. to Ont., n. Mich., n. N.Y., and n. Me.; closely related to the more southerly *S. rigida* Muhl. (*S. cordata* Muhl.).

5a. **S. cordata,** var. **abrasa** Fernald, Rhod. 48: 34. 1946.

River banks (Ann.; Bon.; PCa.; Mat.).

(Boreal-)temperate eastern American: Gaspe to Nfld., southw. to Me.

6. **S. Bebbiana** Sarg. [N-M] (*S. rostrata* Richards.)

Calcicole: sea cliffs (Bic; Rim.; Trl.; Srl.; Prr.; Lou.; Mad.; Lbn.; For.; Gpe.; Pcé.); river ledges and gravels (Ren.; Gnd.; PCa.; Mat.); sand dunes (Pén.).

Halophyte: brackish swamp (Bnc.).

Boreal American: Alaska, Yukon, and Mack. to James Bay, s. Lab., and Nfld., southw. to Calif., N. Mex., Nebr., Ind., and N.J.; e. Asia.

The plants of the stations cited above include those with branchlets and lower surface of leaves densely cinereous with a persistent tomentum (var. *capreifolia* Fernald; Rhod. 16: 177. 1914) and those with branchlets and leaves smooth and glabrous (var. *perrostrata* Schneider; *See* Rhod. 16: 177. 1914). Because of the abundance of intermediate forms, however, and the absence of definite geographical ranges, Raup has merged these two varieties with the typical species (Sargentia 4: 116-117. 1943). Included, also, is var. *luxurians* Fernald (Rhod. 9: 223. 1907; type from Bic).

7. **S. discolor** Muhl. [N-M] Pussy Willow. Glaucous Willow

Sea cliffs (Plr.; Lbn.; For.); river banks (Bic; Mtn.; Yrk.; PCa.); wet soil (Bic; Rim.); railway embankment (Cha.); sea beach (Bic; Ste. Luce); edge of subalpine brook (Alb.).

(Boreal-)temperate American: Sask. to s. James Bay, Mingan Is., and Nfld., southw. to Mo., Ill., and Del., and in the mts. to N.C.

7a. **S. discolor,** var. **Overi** Ball, Rhod. 26: 137. 1924.

Woods (Bic); sea ridges and boulders (Baie des Sables; Rim.; Gro.; Pointe du Gros Mâle); subalpine woods (Alb.).

Probably range of the species.

8. **S. humilis** Marsh. [N] Prairie Willow

Conifer woods (Bic); dry rocks (Rim.); quartzite hill (St. Simon); river gravels (Mtn.; Bon.); beach (Ste. Luce.).

(Boreal-)temperate eastern American: Minn. to Côte Nord and Nfld., southw. to Kans. and N.C.

8a. **S. humilis,** var. **keweenawensis** Farwell.

Sea ridges (Bic); marly bog at river mouth (Gnd.); subalpine slopes (Mtt.; Ftn.).

Boreal eastern American: more northerly than the species, extending into Labrador.

9. **S. pellita** Anderss. [N-M]

River ledges and gravels (Rim.; Ann.; Gnd.; Bon.; Mat.); wet soil (Pte. au Père; Lac Matapédia); roadside (Val d'Espoir); brackish swamp (Bnc.).

Boreal American: Sask. and central Man. to s. James Bay, Lab., and Nfld., southw. to Mich., Me., and Vt.

Forma *psila* Schneider, with normal leaves glabrescent, has been collected from river gravels (Mtn.; Drt.; Gnd.; Dan.; Bon.; PCa.; Mat.) and from the edge of a marly pond (Lac Porc-Epic, Bic).

10. **S. candida** Flügge. [N] Sage Willow. Hoary Willow

Calcicole: cedar swamp (Bic); shores of marly ponds (Val d'Espoir; Gnd.); swampy soil (Baie des Sables; Ann.; For.; Jhn.; Mal.).

Halophyte: brackish marshes (Bnc.; Bon.).

Psammophilous halophyte: sea beach (R. Blanche).

Boreal American: Alaska, Yukon, Mack. (Great Bear L.), Hudson Bay (Churchill and Richmond Gulf), Lab., and Nfld., southw. to Iowa and N.J.

10a. **S. candida,** var. **denudata** Anderss.

Calcicole: marly bogs at river mouths (Ann.; Gnd.).

Halophyte: swampy shores (Sacré-Cœur; Trl.).

Boreal eastern American: James Bay to Nfld., southw. to Wis. and N.Y.

11. **S. laurentiana** Fernald, Rhod. 9: 221. 1907. [N-M]

Calcicole: sea cliffs (R. Blanche; Mtn.; Méchins (type station for fruiting specimens); Trl. (type station for specimens with mature foliage); Srl.).

Boreal eastern American: s. James Bay, Lake Mistassini, and s. Lab., southw. to Mingan Is. and Gaspe.

12. **S. paraleuca** Fernald, Rhod. 16: 175. 1914. [N-M] (*S. stenocarpa* Fernald; *See* Journ. Arn. Arb. 1: 75. 1919.)

Calcicole: river ledges (Drt.; Jhn.; Gnd. (type station); Res.).

Gulf endemic: Gaspe Peninsula, Côte Nord.

13. **S. vestita** Pursh. [N] Rydberg, p. 198.

Calcicole: sea cliffs (Ros.; Pcé.); river ledges (Ann.; Lou.); cliffs above subalpine lake (Lac des Américains, Tbl.); alpine schists (Log.; Ftn.; Mtt.); subalpine meadow (Tbl.).

(Arctic-)boreal American, alpine: mts. of s. B.C. and s. Alb., middle Hudson Bay (w. and e. coast), Akpatok I., Ungava, n. Lab., and Nfld., southw. to e. Oreg. and n. Mont., and Gaspe; Altai Mts. of Asia.

13a. **S. vestita,** var. **psilophylla** Fernald & St. John, Vict. Mem. Mus. Mem. 126: 44. 1922.

Wet schistose walls of the Shickshock Mts. (*See* Fernald, Rhod. 48: 41: 1946).

Quebec endemic: Lake Mistassini, Côte Nord, and Gaspe.

14. **S. herbacea** L. [Ch (passive)]

Alpine summits (Alb.; Tbl.; McNab; Log.; Mtt.).

Arctic circumpolar, alpine: Mack. (Great Bear L.), Keewatin, Devon, n. Baffin, Melville, Southampton I., Hudson Bay, n. Lab., and Nfld., southw. in the mts. to Me. and N.H.; Greenland; Iceland; Faeroes; Spitsbergen; arctic and alpine Eurasia.

15. **S. Uva-ursi** Pursh. [Ch(passive)]

Alpine summits (Alb.; Tbl.; Log.; Mtt.; Ftn.).

Arctic eastern American, alpine: east coast of Hudson Bay, s. Baffin, n. Lab., w. Nfld., southw. to N.S. and in the mts. to N.Y.; Greenland.

16. **S. arctophila** Cockerell. [Ch(passive)] (*S. groenlandica* Lundst.)

Peaty and mossy alpine slopes (Tbl.; Mtt.); alpine meadows (Log.; Pem.).

Arctic American, alpine: Alaska, Yukon, Mack. (Mack. R. Delta), Bathurst Inlet, Southampton I., Ellesmere, Baffin, n. Lab., and Nfld., southw. in the mts. to Me.; w. and e. Greenland.

17. **S. arctica** Pall., var. **kophophylla** (Schneider) Polunin. [Ch(passive)] (*S. anglorum* Cham., var *kophophylla* Schneider; *See* Polunin, Journ. Bot. 77: 271. 1939.)

Alpine serpentine summits and slopes (Alb.) (paratype station); alpine schists (Bln.).

Arctic American, alpine: Yukon, Baffin, Hudson Bay, n. Lab., and Nfld., and the mts. of Gaspe.

Two other varieties, differing from the above chiefly in leaf shape, are reported from their type station on the serpentine slopes of Mt. Albert. These are the disjunct-American var. *araioclada* (Schn.) Raup (*S. anglorum* Cham., var. *araioclada* Schneider, Bot. Gaz. 66: 133. 1918), ranging in the mountains from B.C. and Alb. to Mont., and from n. Lab. to Gaspe; and the local endemic var. *antiplasta* (Schn.) Fernald (*S. anglorum,* var. *antiplasta* Schneider, Bot. Gaz. 66: 134. 1918).

18. **S. hebecarpa** Fernald. [N] (*S. fuscescens,* var. *hebecarpa* Fernald, Rhod. 9: 224. 1907; *See* Rhod. 26: 123. 1924.)

Alpine bogs on serpentine tableland (Alb.) (type station).

Disjunct American, alpine: Alaska (*See* Hultén, Fl. Alaska and Yukon 3: 520-521. 1943); Mt. Albert, Gaspe Peninsula.

19. **S. pedicellaris** Pursh, var. **hypoglauca** Fernald, Rhod. 11: 161. 1909. [N] Bog Willow

Edge of small lake (Bic); alpine bogs and meadows (Alb.; Tbl.).

Temperate American: B.C. to e. Que., southw. to Wash. and N.Y.

20. **S. obtusata** Fernald, Rhod. 9: 223. 1907. [N]

Calcicole: river gravels (Ann.) (type station); cedar swamp (New Carlisle).

Gaspe endemic. Closely related to the Siberian *S. pyrolaefolia* Ledeb.

21. **S. myrtillifolia** Anderss. [N]

Calcicole: marly bog at river mouths (Gnd.; Bon.); cedar swamp (New Carlisle); calcareous alpine meadow (Tbl.).

Boreal American, alpine: Alaska, Yukon, Mack., Hudson Bay, Lab., and Nfld., southw. to Alb., Sask., Ont., and Gaspe.

21a. **S. myrtillifolia,** var. **brachypoda** Fernald, Rhod. 16: 172. 1914.

Calcicole: river gravels (Ann.).

Gulf endemic: Gaspe Peninsula and Nfld.

22. **S. chlorolepsis** Fernald, Rhod. 7: 186. 1905 [N]

Alpine meadows and wet crevices of serpentine barrens (Alb.).

Local endemic. Apparently closely related to the boreal western American *S. desertorum* Richardson.

23. **S. calcicola** Fern. & Wieg. [N] (*S. Richardsonii* Hook., var. *Macouniana* Bebb.; *See* Rhod. 13: 251. 1911.)

Calcicole: calcareous alpine cliffs (Tbl.).

Arctic eastern American, alpine: Keewatin coast of Hudson Bay, Southampton I., Hudson Str., s. Baffin, n. Lab., Nfld., and mts. of Gaspe.

24. **S. argyrocarpa** Anderss. [N]

Alpine meadows and wet slopes (Tbl.; Log.; Mtt.; Ftn.; Bln.).

Arctic eastern American, alpine: Hudson Bay, n. Lab., and Nfld., and the mts. of Gaspe, Me., and N.H.

25. **S. brachycarpa** Nutt. [N] (*S. desertorum* Anderss.; *S. desertorum,* var. *stricta* Rydberg; *S. stricta* Rydberg.) Rydberg, p. 197.

Exposed alpine barrens and slopes (Alb.).

Disjunct American, alpine: Mack. and Alb., southw. to Colo.; James Bay, Anticosti, Nfld., and Gaspe.

25a. **S. brachycarpa,** var. **antimima** (Schneider) Raup. (*S. chlorolepis*, var. *antimima* Schneider; *S. desertorum* Fernald; *See* Rhod. 33: 243. 1931.)

Wet alpine serpentine slopes (Alb.) (type station).

Disjunct American, alpine: Athabasca-Great Slave Lake region; Hudson Bay (Churchill, Port Harrison), James Bay, and the mts. of Gaspe.

25b. **S. brachycarpa,** var. **Sansoni** Ball, Univ. Calif. Pub. Bot. 17: 414. 1934.

Wet alpine serpentine barrens (Alb.).

Disjunct American, alpine: B.C. and Alb. to Oreg.; Gaspe.

A hybrid, × *S. gaspeensis* Schneider (*S. brachycarpa* × *chlorolepis*), has been collected from the alpine serpentine plateau and wet slopes of Mt. Albert, the type station (Journ. Arn. Arb. 3: 80. 1921).

26. **S. cordifolia** Pursh, var. **callicarpaea** (Trautv.) Fernald. [Ch(passive)] *See* Fernald, Rhod. 28: 182. 1926.

Alpine summits and slopes (Alb.; Tbl.; Pem.; Log.; Ftn.; Bln.).

Arctic eastern American, alpine: Somerset I., Baffin, Hudson Bay, n. Lab., and Nfld., southw. to James Bay and in the mts. of Gaspe.

26a. **S. cordifolia,** var. **intonsa** Fernald, Rhod. 28: 185. 1926.

Dry alpine slopes (Tbl.; Bln.; McNab).

Arctic eastern American, alpine: Hudson Bay, s. Baffin, n. Lab., and Nfld., southw. to James Bay and the mts. of Gaspe; Greenland.

26b. **S. cordifolia,** var. **Macounii** (Rydberg) Schneider. (*S. Macounii* Rydb.)

Alpine summits and slopes (Alb.; Mtt.; Log.; Ftn.; Pem.; Bln.).

Arctic eastern American, alpine: James Bay, Hudson Strait, n. Lab., and Nfld., and the mts. of Gaspe.

26c. **S. cordifolia,** var. **tonsa** Fernald, Rhod. 28: 187. 1926.

Alpine slopes (Mtt.).

(Arctic-)boreal eastern American, alpine: n. Lab. and Nfld., and the mts. of Gaspe.

27. **S. planifolia** Pursh. [N] (*S. chlorophylla* of authors, probably not Anderss.; *S. phylicifolia* of Gray's Man., ed. 7.)

Alpine summits and slopes (Alb.; Log.; Mtt.; Ftn.; Bln.); alpine meadow (Tbl.); calcareous alpine meadow (Tbl.).

Arctic American, alpine: Yukon, Mack. (Great Bear L., Great Slave L.), Hudson Str., s. Baffin, n. Lab., and Nfld., southw. in the mts. to N. Mex. and N.H.

25. MYRICACEAE

(Sweet Gale Family)

1. Myrica L.

(Sweet Gale)

a. Leaves more or less pubescent, at least on the veins beneath............1. *M. Gale*
a. Leaves glabrous or glabrate throughout..................1a. *M. Gale,* var. *subglabra*

1. **M. Gale** L. [N]

Swampy soil (Bic; Mét.; Baie des Sables; Drt.; PCa.; Mar.; Mat.; Sayabec; Irn.). General in its habitat.

Boreal circumpolar: Alaska, Yukon, Mack. (Mack. R. Delta, Great Bear L.), Keewatin, Lab., and Nfld., southw. to Wash., Minn., Mich., and N.Y., and in the mts. to Va.; n. Eurasia.

1a. **M. Gale,** var. **subglabra** (Chev.) Fernald, *See* Rhod. 16: 167. 1914.

Alluvial island at river mouth (Bon.).

Boreal eastern American: Lake Huron to Lab., southw. to Pa. and N.J.

26. BETULACEAE

(Birch Family)

a. Staminate flowers without a calyx, naked, 1 (or at least appearing to be 1) to each bract; pistillate flowers with a calyx, clustered in a scaly bud; nut not winged; involucre leafy-coriaceous, fused into a long tubular beak, villous.........1. *Corylus*
a. Staminate flowers with a calyx, 2-6 to each bract; pistillate flowers without a calyx; nut winged or wingless, without an involucre; fruiting spikes cone-like.
  b. Pistillate spike solitary; fruiting bracts deciduous with or soon after the nuts, thin, 3-lobed; nuts with a thin wing; stamens 2, bifid..................2. *Betula*
  b. Pistillate spikes racemose; fruiting bracts persistent, thick and woody, not lobed; nuts wingless or with a coriaceous margin; stamens 4, not bifid............3. *Alnus*

1. Corylus (Tourn.) L.

(Hazelnut)

a. Beak of fruit 2-4 cm. long; leaves 7-10 cm. long......................1. *C. cornuta*
a. Beak 4-5 cm. long; leaves 8-13 cm. long, 7-9 cm. wide..1a. *C. cornuta,* var. *megaphylla*

1. **C. cornuta** Marsh. [N-M] (*C. rostrata* Ait.)

Thickets (Bic; Rim.; Mtn.; Cap Chat; Marsouins; Prr.; Drt.; PCa.; Mat.; Amqui). General.

(Boreal-)temperate American: B.C. to e. Que. and Nfld., southw. to Oreg. and Del., and in the mts. to Mo. and Ga.

1a. **C. cornuta,** var. **megaphylla** Victorin & Rousseau, Contrib. Inst. Bot. Univ. Montréal, No. 36: 13. 1940.

Thickets at river mouths (Marsouins (type station); Mat.).

Reported so far only from the above stations.

2. BETULA (Tourn.) L.
(Birch)

[Fernald: Some North American Corylaceae (Betulaceae). 1. Notes on Betula in eastern North America; Rhodora 47: 303-329, pls. 963-975. 1945.]

a. Leaves with 8 or more pairs of nerves impressed above; fruiting aments 1 cm. or more thick, narrow-ovoid to subglobose, their scales rather persistent and with barely spreading ciliate lobes; wing of fruit not broader than the achene; trees with yellowish or silvery grey bark detaching in very thin filmy layers........1. *B. lutea*

a. Leaves with 7 or less pairs of prominent veins; fruiting aments slender-cylindric, their scales readily deciduous.

b. Leaves subsessile or short-petioled, small, thickish or coriaceous; aments mostly erect, sessile or short-peduncled; wings narrower or rarely as broad as the achene, or wanting; shrubs with dark scarcely papery bark.

c. Young branchlets pubescent with long soft hairs, not glandular; leaves obovate, orbicular or reniform, 1-3·5 cm. long, pale beneath, finely reticulated on both faces, not resiniferous..2. *B. pumila*

c. Young branchlets glabrous or at most minutely puberulent, conspicuously dotted with resinous wart-like glands; leaves 0·5-3 cm. long, green and glabrous both sides, slightly reticulated.

Leaves wedge-obovate; stem ascending.......................3. *B. glandulosa*

Leaves orbicular or reniform; dwarf plant with procumbent stems............ ....3a. *B. glandulosa*, var. *rotundifolia*

b. Leaves and aments petioled, the leaves thinner and mostly larger.

c. Samaras 3·5-6·5 mm. broad, the wings broader than the achene.

d. Leaves glabrous on both sides; young shoots glabrous or merely with resinous warts.

e. Tree with whitish bark; leaves deltoid-ovate, acuminate from broad base, those of fertile branches 5-10 cm. long; staminate aments 4-10 cm. long; lateral lobes of pistillate bracts divergent, larger than terminal lobe........ ....4. *B. caerulea-grandis*

e. Shrub with dark close bark; leaves ovate, merely acute to blunt, those of fruiting branches 1·5-4·5 cm. long; staminate aments 1·5-3·5 cm. long; lateral lobes of pistillate bracts ascending, scarcely broader than terminal lobe...5. *B. minor*

d. Leaves pubescent beneath, at least when young, or on veins or in their axils, mostly acuminate, those of fertile branches 2·5-10·5 cm. long; mature fertile aments 1·5-6·5 cm. long; young vegetative shoots pubescent or puberulent.

e. Leaves merely rounded to tapering at base.

f. Bracts of pistillate aments 3-lobed; peduncle usually shorter than fruiting ament, the latter 2·5-6·5 cm. long.

g. Mature fertile bracts 3·5-7 mm. long, with divergent lateral lobes; samaras 3·5-5 mm. broad.

h. Branchlets spreading or ascending, not strongly drooping; leaves of fertile branches broadly ovate, mostly rounded at base; pistillate aments mostly solitary on the spurs.

Bark of trunks of fruiting trees creamy to pinkish white, very soon exfoliating...6. *B. papyrifera*

Bark of fruiting trunks warm brown, only on oldest bases with smooth outer brown layer exfoliating............................ ....6a. *B. papyrifera*, var. *commutata*

h. Branchlets pendulous; leaves of fertile branches narrowly ovate to ovate-lanceolate, only slightly rounded to gradually tapering to petiole; pistillate aments often in fascicles of 2-4 on spurs............ ....6b. *B. papyrifera*, var. *pensilis*

g. Mature fertile bracts 7-10 mm. long, with ascending lateral lobes; samaras 6-8 mm. broad; leaves ovate, with rounded bases; fruiting aments solitary or paired, 0·5-1·5 cm. long........................... ....6c. *B. papyrifera*, var. *macrostachya*

f. Bracts unlobed or with merely rudimentary lateral lobes, elliptic-oblong; pistillate aments 1·5-2 cm. long, about equalled by the arched-recurving peduncle; leaves rhombic-oval, dentate....6d. *B. papyrifera*, var. *elobata*

e. Leaves definitely cordate at base; bracts of mature pistillate aments 5-10 mm. long, mostly with ascending lobes; bark of mature trunks warm brown to creamy or pinkish white...............6e. *B. papyrifera*, var. *cordifolia*

c. Samaras 2-3·5 mm. broad, the wings scarcely to barely as broad as the achene; new sprouts pubescent; leaves elliptic, rhombic-oval or ovate; shrub with close dark bark...7. *B. borealis*

1. **B. lutea** Michx. f. [MM] Yellow Birch

Woods (Cap Chat; Ann.; Prr.; Bon. I.; Drt.; Dou.; Mal.; Gnd.; Bon.; PCa.; GCa.; Irn.); woods below mountain (Alb.).

(Boreal-)temperate American: Man. to Nfld., southw. to Minn. and Del., and in the mts. to Tenn. and Ga.

2. **B. pumila** L. [N] Swamp Birch

Marly cedar swamp at river mouth (Bon.); cedar swamp (Mont Joli); bog (Ste. Luce).

Boreal circumpolar: N.W.T. to James Bay, Lab., and Nfld., southw. to Minn., Ohio, and N.J.; Greenland; Eurasia.

3. **B. glandulosa** Michx. [N] Dwarf Birch

Bog (Ste. Luce).

Arctic American: Alaska, Yukon, Mack., Somerset I., n. Hudson Bay, Southampton I., Baffin, n. Que., n. Lab., and Nfld., southw. to Calif., Colo., Minn., Mich., and N.Y.; s. Greenland.

3a. **B. glandulosa,** var. **rotundifolia** (Spach) Regel. [Ch(passive)]

Alpine summits and slopes (Alb.; Tbl.; Mtt.; Bln.).

Arctic circumpolar, alpine: Alaska, Victoria I., Baffin, Hudson Bay, n. Lab., southw. in the mts. to Me. and N.H.; n. Asia.

4. **B. caerulea-grandis** Blanchard. [M-MM] Blue Birch

Dry woods, Gaspe Peninsula (*See* Fernald, Rhod. 47: 305. 1945).

Temperate eastern American: central and eastern Quebec, southw. to N.S., n. N.Eng. and e. N.Y.

5. **B. minor** (Tuckerm.) Fernald. [N] (*B. papyrifera* Marsh., var *minor* (Tuckerm.) Wats. & Coult.)

Alpine summits and slopes (Alb.; Tbl.; Log.; Mtt.; Ftn.; Str.; Lyl.; Bln.). (Some Gaspe specimens distributed as *B. microphylla* Bunge.)

Boreal American, alpine: Sask., James Bay, Lab., southw. to Minn., and in the mts, to n. N. Eng. and n. N.Y.

6. **B. papyrifera** Marsh. [MM]

Woods, especially on slopes (Bic; Mét.; Marsouins; Prr.; Anse au Vallon; Lbn.; Drt.; Mal.; Pcé.; Bon.); subalpine slopes and valleys (Alb.; Lac Ste. Anne). General. According to Halliday and Brown (1943), shows a population intensity of 10 to 20 per cent in the southern part of the peninsula, 1 to 10 per cent in the northern part.

Boreal American: Alaska to James Bay, Lab., and Nfld., southw. to Wash., S. Dak., Iowa, Ill., Ind., Ohio, W. Va., and Pa.

6a. **B. papyrifera,** var. **commutata** (Regel) Fernald.

Woodlands near the coast (Pcé.).

Disjunct American: s. Alaska, s. Yukon, Mack. (Great Bear L.), southw. to Oreg.; s. James Bay; s. Lab. to w. Me. and e. Mass.

6b. **B. papyrifera,** var. **pensilis** Fernald, Rhod. 47: 318. 1945.

Thickets and borders of woods (Bic; Marsouins).

Boreal eastern American: w. Que. to Nfld., southw. to n. N.Y. and N.S.

6c. **B. papyrifera,** var. **macrostachya** Fernald, Rhod. 47: 318. 1945.

Woods near the sea (Bic); cold northerly calcareous cliffs (Pcé.).

Boreal eastern American: e. Que. to Nfld., southw. to n. Me. and N.S.

Var. *macrostachya,* forma *longipes* Fernald (Rhod. 47: 319. 1945), with peduncles 2-3 cm. long and one-half to essentially as long as the pendulous ament rather than many times shorter, has been found in woods at Malbaie and under the north slope of Mount Logan, the type station.

6d. **B. papyrifera,** var. **elobata** (Fernald) Sargent. (*B. alba,* var. *elobata* Fernald, Rhod. 15: 169. 1913.)

Crevices and talus of serpentine ravine walls (Alb.) (type station).

Local endemic: known only from the type station.

6e. **B. papyrifera,** var. **cordifolia** (Regel) Fernald.

Woods (Bic; Rim.; Ren.; Drt.; Mal.; Mat.; Irn.); subalpine woods (Alb.; Lac Ste. Anne, Tbl.; Log.; Mtt.; Str.; Bln.).

Boreal American: Alaska to James Bay, s. Lab., and Nfld., southw. to n. Iowa and N. Eng., and in the mts. of N.C.

7. **B. borealis** Spach. [M-MM]

Clay river banks (Mtn.); crevices and talus of serpentine (Alb.).

(Arctic-)boreal eastern American, alpine: James Bay to Ungava and s. Lab., southw. to Gaspe and Nfld., and very rarely to Cape Breton and n. Vt.

3. ALNUS (Tourn.) Hill
(Alder)

a. Flowers developed with the leaves; sterile catkins from naked buds, the fertile from scale-covered buds; fruit with a conspicuous thin wing; leaves irregularly serrulate or bi-serrulate with very fine and closely set sharp teeth, the lower surface green.
  b. Lower surface of leaves glutinous, glabrous or slightly pubescent on the principal veins; young branches and peduncles sparingly puberulent or glabrate; fertile catkins 1-1·5 cm. long........................1. *A. crispa*
  b. Lower surface of leaves permanently covered with dense soft hairs; young branches and peduncles permanently soft-pubescent; fertile catkins 1·2-2 cm. long........................1a. *A. crispa,* var. *mollis*

a. Flowers developed in earliest spring before the leaves; catkins all from naked buds; fruit wingless or with a narrow margin; leaves sharply and doubly serrate with low toothing, glaucous or whitened and glabrous beneath, the upper surface dark green and with impressed nerves........................2. *A. rugosa,* var. *americana*

1. **A. crispa** (Ait.) Pursh. [N-M] Green or Mountain Alder

Thickets above sea ledges (Bic; Rim.; Car.); sea cliffs (Prr.; Pcé.); river ledges (Ann.); alpine slopes (Alb.; Tbl.; Log.; Bln.).

Arctic ?circumpolar: Alaska, Yukon, Mack. (Mack. R. Delta, Great Bear L.), Keewatin, Hudson Bay (near Churchill), e. coast of James Bay, Ungava Bay, n. Lab., and Nfld., southw. to n. Calif., w. Mont., ?Colo., Minn., the Great Lakes, and in the mts. to N.C.; sw. Greenland; large gap in western Europe; eastern Europe from Mezen R. to Petchora R. and the arctic Urals; n. Asia.

Forma *stragala* Fernald, Rhod. 47: 144. 1945, with prostrate trunk and branches, mature leaves 2-4·5 cm. long and mature female catkins 0·8-1 cm. long, has been collected from Mt. Albert and the type station, Mt. Logan.

1a. **A. crispa,** var. **mollis** Fernald. (*A. mollis* Fernald.)

Sea cliffs and ledges (Bic; Rim.; Mét.; Mtn.; Ann.; Trl.; Prr.; Mrn.; Mad.); river banks and ledges (Yrk.; Gnd.; Bon.; PCa.); subalpine slopes (Mtt.; Bln.).

(Boreal-) temperate American: Man. to Lab. and Nfld., southw. to the Great Lakes region and N.Y.

2. **A. rugosa.** (DuRoi) Spreng., var. **americana** (Regel) Fernald. [N-M] (*A. incana* of Gray's Man., ed. 7; *See* Fernald, Rhod. 47: 333-361. 1945.) Speckled Alder

Swampy soil (Bic; Rim.; Mét.; Mtn.; Grand Lac Matane; Ann.; Lac Pleureuse; Drt.; Yrk.; Dou.; Gnd.; Bon.; Mat.); edge of subalpine lake (Lac Ste. Anne, Tbl.). General.

Boreal American: Sask., Hudson Bay, Lab., and Nfld., southw. to Iowa, Wis., Ind., Ohio, W. Va., Md., Pa., and Mass.; generally more northern than the typical form with leaves green or fulvous, not glaucous, beneath.

27. FAGACEAE

(Beech Family)

a. Staminate flowers in a head on a drooping peduncle; cupule 2-flowered, 4-valved, containing 2 sharply triangular nuts; leaves oblong-ovate, mostly cuneate at base, taper-pointed, distinctly and often coarsely toothed, light green............1. *Fagus*

a. Staminate flowers in slender flexuous drooping catkins; cupule 1-flowered, scaly, valveless; leaves moderately pinnatifid, the lobes acuminate from a broad base, with a few coarse teeth..2. *Quercus*

1. Fagus (Tourn.) L.

(Beech)

1. **F. grandifolia** Ehrh. [MM]

Abundant in a maple woods (St. Matthieu, Rimouski co.); reported also from St. Valérien; edge of river (Mat.).

Temperate eastern American: Wis. to e. Que., southw. to Tex. and Fla.

2. Quercus (Tourn.) L.

(Oak)

a. Cup or involucre 2·5-3 cm. wide, flattened at the base..................1. *Q. rubra*

a. Cup or involucre of the mature fruit 1·5-2 cm. wide, conical at the base..1a. *Q. rubra*, var. *borealis*

1. **Q. rubra** L. [MM] (*Q. borealis,* var. *maxima* (Marsh.) Ashe; *See* Fernald, Journ. Arnold Arb. 27: 389. 1946.)

Limestone cliffs on south face of Bic Mt. (Bic); woods (Anse au Griffon; Mar.; Car.) (northeastern limit at Anse au Griffon).

Temperate eastern American: Minn. to e. Que., southw. to Tex. and Fla.

1a. **Q. rubra,** var. **borealis** Farwell. (*Q. borealis* Michx. f.)

Woods (Oakbay, Bonaventure co.) (northeastern limit).

Temperate eastern American: Minn. to e. Que., southw. to Kans. and Ga.

28. URTICACEAE

(Nettle Family)

a. Leaves palmately 3-7-lobed or -divided.
  b. Leaves 5-7-divided, the divisions narrow; pistillate flowers forming an irregular spicate cluster; plant erect..1. *Cannabis*
  b. Leaves 3-5-lobed, the divisions broad; pistillate flowers in cone-like spikes; fruiting calyx, achenes, etc., sprinkled with yellow resinous grains; plant twining...2. *Humulus*

a. Leaves not lobed; plants beset with stinging hairs, not climbing.
  b. Leaves alternate; sepals of the staminate flowers 5, of the pistillate flowers 4; stigma long-subulate; achenes oblique, reflexed, naked.............3. *Laportea*
  b. Leaves opposite; sepals 4 in both fertile and sterile flowers; stigma capitate-tufted; achene straight and erect, enclosed by the two inner and larger sepals...4. *Urtica*

1. Cannabis (Tourn.) L.

(Hemp)

1. C. SATIVA L. [T]

Reported from Matapedia.

Asiatic: adventive in temperate N.A.

2. Humulus L.

(Hop)

1. **H. Lupulus** L. [Grh]

Field above beach (Pte. au Père); alluvial woods at river mouth (Mat.); habitat not stated (Bic; Lou.).

Temperate circumpolar: Man. to e. Que., southw. to Mont. and Ga.; Eurasia.

3. Laportea Gaud.

(Wood Nettle)

1. **L. canadensis** (L.) Gaud. [Grh]

Damp woods (Rim.; PCa.; GCa.; Car.; Nou.; Mat.).

Temperate eastern American: Minn. to e. Que., southw. to Kans and Fla.

4. URTICA (Tourn.) L.

(Nettle)

a. Perennials; flower-clusters in branching panicled spikes, often dioecious.
  b. Petiole more than half as long as the leaf-breadth.
    c. Leaves lanceolate to ovate, rounded to cordate at base, glabrous on both surfaces or sparingly pilose beneath, coarsely serrate, with petioles 1·5-5·5 cm. long; stipules thin, greenish to stramineous, glabrous to pilose; stem glabrous above or somewhat setulose and sparingly pilose..........................1. *U. gracilis*
    c. Leaves oblong-lanceolate to narrowly ovate-lanceolate, usually cinereous-puberulent beneath, rather closely serrate, with petioles 1·5-8·5 cm. long; stipules submembranous, cinereous-puberulent; stem only slightly if at all bristly but cinereous-pilose or -puberulent toward the summit...........2. *U. procera*
  b. Petioles less than half as long as the leaf-breadth.
    c. Plant very bristly and stinging; leaves ovate-cordate, very deeply serrate, downy beneath..3. *U. dioica*
    c. Stem glabrous, or pilose above; leaves lanceolate to narrowly ovate, firm, rounded at base, glabrous on both surfaces or pilose-hirsute beneath, coarsely serrate..4. *U. viridis*

a. Annual; flower-clusters 2 in each axil, small and loose, containing both staminate and pistillate flowers; leaves thin, elliptic or ovate, very coarsely and deeply serrate with long spreading teeth..5. *U. urens*

1. **U. gracilis** Ait. [Hpr] (*U. Lyallii* of eastern Am. authors, not Wats.; *See* Fernald in Rhod. 28: 191-198. 1926.)

Thickets on sea cliffs (Srl.; Plr.; Pcé.; Bon. I.); thickets by river (Drt.; Mat.); subalpine thickets (Tbl.; Log.; Col.).

Boreal American: Alaska, Mack. (Great Bear L., Great Slave L.), and s. Hudson Bay to Côte Nord and Nfld., southw. to Calif., N. Mex., and n. N.Y.

2. **U. procera** Muhl. [Hpr] (*U. gracilis* of most Am. auth., not Ait.; *See* Fernald in Rhod. 28: 191-198. 1926.)

Wet ground (Lac du Club).

Temperate American: N. Dak. to e. Que., southw. to La. and N.C.

3. U. DIOICA L. [Hpr] Stinging Nettle

Waste places (Gpe.; Yrk.).

European: sparingly naturalized in temperate eastern N.A.

4. **U. viridis** Rydb. [Hpr]

Calcicole: sea cliffs (Prr.; Plr.; For.; Pcé.; Bon. I.).

Disjunct American: Alb. to S. Dak. and N. Mex.; e. Que., s. Lab., and Nfld., southw. to Me.

5. U. URENS L. [T]

Waste places (Gnd.; Bon.); edge of river (Rim.); gravel beach (Pas.).

European: naturalized in temperate N.A.; Iceland; Faeroes.

29. ULMACEAE
(Elm Family)

1. ULMUS (Tourn.) L.
(Elm)

1. **U. americana** L. [MM] American Elm

Woods (Beauséjour, Rimouski co.; Cap Chat; Cld. (northeastern limit); PCa.; GCa.; Nou.; Mat.).

(Boreal-)temperate American: Sask. to s. Nfld., southw. to Tex. and Fla.

30. SANTALACEAE
(Sandalwood Family)

a. Inflorescence terminal, corymbose, of 1-6 few-flowered umbels, the flowers perfect; disk elongate, shallowly lobed; style filiform and prolonged; fruit a dry nut, exserted from the coriaceous calyx-tube.........................1. *Comandra*

a. Inflorescence axillary, of 1-3 simple mostly 3-flowered umbels, the central flower perfect, the lateral mostly staminate and dropping after anthesis; disk salverform, deeply lobed; style conical, very short; fruit a scarlet and juicy false-drupe, the succulent calyx-tube completely surrounding the nut; rootstock subterranean, slender and cord-like.........................2. *Geocaulon*

1. COMANDRA Nutt.
(Comandra)

1. **C. Richardsiana** Fernald. [Grh]

Calcicole: dry gravel (Bic); slaty sea ridges (Bic); sandy river alluvium (Gnd.) (type station); sand (Cap Chat).

Boreal American: B.C. to Lab. and Nfld., southw. to Calif., Kans., Mo., Ind., and Ga.

2. GEOCAULON Fernald

1. **G. lividum** (Richards.) Fernald. [Grh] (*Comandra livida* Richards.; *See* Fernald, Rhod. 30: 23. 1928.)

Sterile soil and mossy woods (Bic; Rim.; Ann.; Pén.; Pcé.; Gnd.; Bon.; PCa.; GCa.; Car.; Anse à la Loutre); heath bogs (Bic; Ann.; Sayabec); subalpine woods (Tbl.; Log.; Str.; Ftn.; Bln.; Mont Baldé); alpine bog (Alb.).

Boreal American: Alaska, Yukon, Mack., Hudson Bay (Churchill), Lab., and Nfld., southw. to Wash., Idaho, Minn., Mich., and N.H.

31. LORANTHACEAE
(Mistletoe Family)

1. ARCEUTHOBIUM Bieb.
(Dwarf Mistletoe)

1. **A. pusillum** Peck. [M (epiphytic)]

On *Picea mariana*, producing "witches' brooms" on the parasitized trees (Cap Chat; Ann.; Mtt.).

(Boreal-)temperate eastern American: Mich. to Nfld., southw. to Pa.

32. ARISTOLOCHIACEAE
(Birthwort Family)

1. Asarum (Tourn.) L.
(Wild Ginger)

1. **A. canadense** L. [Hrr]

Woods (PCa.; Mat.).

Temperate American: Man. to e. Que., southw. to Kan., Mo., and N.C.

33. POLYGONACEAE
(Buckwheat Family)

a. Sepals 4, the outer pair smaller and spreading, the inner pair broader and erect in fruit; stigmas 2, sessile, tufted; achene lenticular, surrounded by a broad veiny wing; stamens 6; leaves round-reniform, long-petioled, chiefly radical; sheaths obliquely truncate; alpine plants..1. *Oxyria*

a. Sepals 5 (sometimes 4), equal and erect in fruit; stigmas not tufted.
  b. Leaves triangular-hastate; plant erect; achene 3-angled, much exserted from the scarcely enlarged calyx..2. *Fagopyrum*
  b. Leaves not triangular-hastate, or if so the stem climbing by prickles or twining; achene lenticular or 3-angled, the styles or stigmas accordingly 2 or 3; flower-pedicels jointed..3. *Polygonum*

a. Sepals 6; stigmas 3, tufted; achene 3-angled.
  b. Sheathing stipules (ocreae) large and prominent; stamens mostly 9; stout large herbs with abundant, very broad radical leaves, the petioles edible........4. *Rheum*
  b. Sheathing stipules less prominent; stamens 6; the 3 outer sepals herbaceous, spreading in fruit, the 3 inner larger, somewhat coloured (in fruit called valves) and convergent over the achene, veiny, often bearing a grain-like tubercle on the back; leaves smaller.. 5. *Rumex*

1. Oxyria Hill
(Mountain Sorrel)

1. **O. digyna** (L.) Hill. [Hrr]

Alpine slopes (Alb.; Tbl.; Log.; Mtt.; Ftn.; Bln.).

Arctic circumpolar, alpine: Aleutian Is., n. coast of Alaska, Yukon, and Mack., Herschel I., Banks I., Victoria I., Ellesmere, Devon, Bylot I., n. Baffin, Melville, n. Lab., and Nfld., southw. in the mts. to Calif., N. Mex., and N.H.; whole of Greenland; Iceland; Faeroes; Spitsbergen; arctic and alpine Eurasia.

2. Fagopyrum Gaertn.
(Buckwheat)

a. Racemes panicled or corymbose; angles of the achene not crested, the achene smooth and shining; flowers rose or white, with 8 nectar-bearing yellow glands between the stamens..1. *F. esculentum*

a. Racemes mostly simple; angles of the achene crested, undulate, the achene very dull and roughish, the sides grooved; flowers smaller, greenish white...2. *F. tataricum*

1. F. ESCULENTUM Moench. [T] Buckwheat

Railroad embankment (Bic); gravel above beach (Bic); fields and roadsides (Trl.; Dou.; Pcé.).

European: cultivated and escaped in temperate N.A.

2. F. TATARICUM (L.) Gaertn. [T] India Wheat

Fields (Lou.; Bon.; New Carlisle; Mar.); ballast-filling about fish-houses (Yrk.).

Asiatic: cultivated and escaped in temperate N.A.

3. POLYGONUM (Tourn.) L.
(Knotweed)

a. Stems twining; leaves sagittate or cordate at base.
  b. Nodes naked; angles of the calyx keeled; achenes dull; leaves ovate-sagittate, glabrous, often scabrous on the veins beneath .... 1. *P. Convolvulus*
  b. Nodes bristly-ciliate; angles of the calyx obscurely keeled; achenes glossy; leaves ovate-cordate, puberulent beneath; stem twining, up to 10 dm. long .... 2. *P. cilinode*

a. Stems not twining; leaves linear to ovate, not cordate (sagittate in No. 3).
  b. Stems armed with hooked prickles, reclining; leaves sagittate, short-petioled; flowers in terminal capitate racemes or heads .... 3. *P. sagittatum*
  b. Stems not armed with prickles.
    c. Flowers axillary; leaves relatively small; sheaths lacerate, scarious; stems striate.
      d. Achenes smooth and shining, olivaceous; seashores.
        e. Stems ascending or subascending; leaves large, elliptic, 4-15 mm. broad, with about 5 pairs of veins; ochrae 7-10 mm. long; achenes 3·5-4·8 mm. long .... 4. *P. allocarpum*
        e. Stems prostrate, the whole plant pale green; leaves narrowly elliptic, smaller and less veiny; ochrae 3-6 mm. long; mature achenes up to 4 mm. long .... 5. *P. Fowleri*
      d. Achenes dull, minutely granular; plants bluish green.
        e. Stems prostrate; leaves lanceolate, usually acute or acutish; sepals hardly 2 mm. long, green with pinkish margins; chiefly waste places .... 6. *P. aviculare*
        e. Stems erect or nearly so; leaves oblong or elliptic.
          f. Otherwise as in preceding .... 6a. *P. aviculare*, var. *vegetum*
          f. Fruiting calyx 3·4-4 mm. long, the 3 outer sepals with narrow pale margin or none, strongly keeled, strongly cucullate at apex, the 2 inner much shorter, rather broadly whitish-margined .... 7. *P. achoreum*
    c. Flowers in terminal spikes or spike-like racemes.
      d. Sheaths not ciliate, except rarely the uppermost.
        e. Spike solitary, erect, bearing a number of red bulblets about its base; leaves lanceolate, the lower petioled, the upper sessile, their margins often revolute; perennial by a corm-like rootstock .... 8. *P. viviparum*
        e. Spikes 1-2, oval-oblong, 1-3 cm. long; leaves elliptic to oblong, glabrous; aquatic or marsh plants with long rootstocks rooting in the mud .... 9. *P. amphibium*, var. *stipulaceum*
        e. Spikes several, slender and drooping; peduncles obscurely glandular or smooth; flowers white or pale rose-colour; achenes ovate, 1·5-1·8 mm. broad .... 10. *P. lapathifolium*
      d. Sheaths fringed with short bristles.
        e. Sepals not glandular-dotted; spikes short and thick, erect, dense; achenes smooth and shining; leaves often marked with a triangular or lunar spot near the middle .... 11. *P. Persicaria*
        e. Sepals dotted with dark glands; spikes strongly arched and nodding, usually short or interrupted; achenes dull, minutely striate; leaves very acrid and peppery.
          f. Pedicels not strongly exserted from the ocreolae; achenes mostly 3-3·5 mm. long .... 12. *P. Hydropiper*
          f. Pedicels strongly exserted from the ocreolae; achenes 2-2·5 mm. long .... 12a. *P. Hydropiper*, var. *projectum*

1. P. CONVOLVULUS L. [T] Black Bindweed

Fields and waste places (Bic; Fla.; Mét.; Lou.; Clr.; Bon. I.; Car.). General.

Eurasian: adventive and partly naturalized throughout N.A. as far north as Wood Buffalo Park; Greenland; Iceland; Faeroes.

2. **P. cilinode** Michx. [Hp]

Roadside thickets and fences (Bic; Rim.; Lou.; Lbn.; Anse aux Canards; Drt.; Bon.; GCa.; Mat.); limestone cliffs (Lbn.). General.

Temperate American: Athabasca to e. Que., southw. to Minn. and N.C.

Forma *erectum* (Peck) Fern., a dwarf erect form, has been collected on slaty sea ridges at Bic and in fields at Matapedia.

3. **P. sagittatum** L. [T] Arrowleaf Tearthumb

Wet places (Bic; Rim.; Bon. I.; New Carlisle; Car.).

(Boreal-)temperate American: Alb. to Mingan Is. and Nfld., southw. to Tex. and Fla.

4. **P. allocarpum** Blake, Rhod. 19: 234. 1917. [T]

Halophyte: salt marsh (Bic).

Psammophilous halophyte: seashores (Ste. Luce; Mét.; PCa.).

(Boreal-)temperate eastern American (maritime): e. Que. to Nfld., southw. along the coast to Me.

5. **P. Fowleri** Robinson. [Hp]

Halophyte: shallow pools of salt water on slaty ledges (Bic); edge of salt marsh (Ann.; Yrk.).

Psammophilous halophyte: sea beach (Pte. au Père; Ste. Luce; Mét.; Trl.; Pcé.; Car.).

Disjunct American (maritime): s. Alaska to Wash.; James Bay to Lab. and Nfld., southw. to Me.; e. Asia.

6. P. AVICULARE L. [Hp] Knotweed

Waste places (Bic; Rim.; Irn.; Yrk.); river bank (PCa.); gravel beach (Pas.; Car.); edge of salt marsh (Nou.).

Eurasian: naturalized throughout (boreal-)temperate N.A. as far north as Great Slave L. and Nfld.; w. and e. Greenland; Iceland; Faeroes.

6a. P. AVICULARE, var. VEGETUM Ledeb.

Roadsides and waste places (Mét.; Gpe.; Mar.; Irn.).

Range of the species.

7. **P. achoreum** Blake, Rhod. 19: 232. 1917. [T]

Halophyte: salt marsh at river mouth (Yrk.) (paratype station).

Boreal American: Alaska, Sask., Minn., James Bay, e. Que., southw. to Mont., Kans., Mo., and Vt.

8. **P. viviparum** L. [Gst] Alpine Bistort

Calcicole: sea cliffs and ledges (Bic; Mét.; Gro.; Srl.; Prr.; Manche d'Epée; Val.; Lbn.; Pcé.; Bon. I.; Nou.); river ledges and gravels (Drt.;

Yrk.; Gnd.; Bon.; PCa.); alluvial soil at river mouth (Dan.); edge of Lac des Américains (Tbl.); calcareous alpine meadow (Tbl.); alpine slopes (Alb.; Log.; Mtt.; Bln.).

Arctic circumpolar, alpine: Aleutian Is., n. coast of Alaska, Yukon, Mack. (Coronation Gulf), Banks I., Victoria I., Melville I., Keewatin, Ellesmere, Devon, Bylot I., n. Baffin, Melville, Southampton I., n. Lab., and Nfld., southw. to Wash., Utah, N. Mex., Minn., and mts. of N.H.; whole of Greenland; Iceland; Faeroes; Spitsbergen; arctic and alpine Eurasia.

Forma *alpinum* (Wahl.) Polunin, with broader and shorter basal leaves and more markedly pink flowers, has been collected at several localities (Pcé.; Bon.; Dan.; Nou.; Tbl.).

9. **P. amphibium** L., var. **stipulaceum** Coleman. [Grh-(Hel)] (*P. amphibium,* var. *Hartwrightii* (Gray) Bissell; *P. natans,* forma *Hartwrightii* (Gray) Stanford; *See* Rhod. 27: 158. 1925; 48: 49-53. 1946.)

Edge of marly ponds (Lac Porc-Epic, Bic; Gnd.); swampy soil (Zén.).

Boreal American: Alaska, Mack. (Great Slave L.), s. Hudson Bay to Nfld., southw. to Calif., Colo., Minn., and Pa.; with the European species, boreal circumpolar.

Var. *stipulaceum,* forma *fluitans* (Eaton) Fernald, the aquatic phase with floating leaves, is found where the terrestrial phase stretches into permanently standing water (Bic; Gnd.).

10. P. LAPATHIFOLIUM L. [T]

Swampy soil at river mouth (Bon.).

Eurasian: naturalized throughout temperate N.A.

11. P. PERSICARIA L. [T]

Edge of pond (Bic); waste places (Bic; Rim.; Mét.; Trl.; Cld.; Pcé.; Bon. I.; Gpe.; Dou.; Gnd.; Bon.).

European: naturalized throughout temperate N.A.

12. P. HYDROPIPER L. [T] Water Pepper. Common Smartweed

Swampy soil (Bic; Rim.; Pte. au Père; Mét.; Gpe.; Dou.; Pcé.; Bon.; New Carlisle; Mar.).

European: naturalized throughout temperate N.A.

12a. **P. Hydropiper,** var. **projectum** Stanford, Rhod. 29: 86. 1927.

Swampy soil (Rim.; Mét.; Mar.).

Temperate eastern American: Wis. to e. Que., southw. to Okla. and Ga.

4. RHEUM L.

(Rhubarb)

1. R. RHAPONTICUM L. [Grh] Bailey, Man of Cult. Pl., p. 247. 1924.

Sand flats of Causapscal River, near an old stable (St. Tharsicius).

Asiatic: cultivated in N.A., and sometimes escaped.

5. RUMEX L.

(Dock. Sorrel)

[Rechinger: The North American species of Rumex; Field Mus. Nat. Hist. Publ. Bot. Ser. 17: 1-151. 1937.]

a. Leaves sagittate or hastate; flowers dioecious; foliage acid.

b. Sepals enlarged in fruit, the valves rounded at apex, 4 mm. broad; leaves sagittate ....1. *R. Acetosa*

b. Sepals scarcely enlarged in fruit, exceeded by the naked achene.

c. Leaves hastate, the narrow lobes entire, widely spreading........2. *R. Acetosella*

c. Leaves attenuate at the base, not hastate, or with 1 or 2 small lobes............ ....2a. *R. Acetosella,* var. *integrifolius*

a. Leaves neither sagittate nor hastate but occasionally cordate; flowers perfect or irregularly monoecious.

c. Grains (tubercles) occupying nearly the whole breadth of the valve; valves 3-4 mm. long, all grain-bearing; pedicels with swollen joints, less than twice as long as the fruit.

c. Grains (tubercles) occupying nearly the whole breadth of the valve; valves 3-4 mm. long, scarcely longer than the grains, yellowish; nutlets about 2·5 mm. long..........3. *R. pallidus*

c. Grains much narrower than the breadth of the valves; valves about 3 mm. long; nutlets about 2 mm. long..........4. *R. triangulivalvis*

b. Stems erect, without axillary shoots.

c. Valves grainless, roundish-ovate or cordate, erose-crenulate, finely and distinctly nerved, up to 5 mm. long; nutlet 3 mm. long..........5. *R. occidentalis*

c. At least 1 valve with a distinct grain.

d. Valves entire.

e. Lower leaves narrowed at base.

f. Valves heart-shaped, 6 mm. broad, usually bearing a single very small grain, or its midrib merely thickened at base; pedicels with swollen joints; leaves lanceolate to ovate-oblong, the basal 6-9 dm. long and 1-1·5 dm. broad..........6. *R. Patientia*

f. Valves orbicular or round-ovate, 4-6 mm. long, 4·5-7·5 mm. broad, all grain-bearing, the grain much longer than broad; pedicels obscurely jointed; leaves smaller..........7. *R. orbiculatus*

e. Lower leaves truncate or obscurely heart-shaped at the base; leaves lanceolate, with strongly wavy-curled margins; whorls of flowers crowded in prolonged wand-like racemes, leafless above; pedicels with swollen joints; valves round-heart-shaped, 4-6 mm. broad, mostly all grain-bearing, the grains very plump, subglobose to ellipsoid, with rounded ends.............. ....8. *R. crispus*

d. Valves with long sharp salient teeth, at least near base.

e. Perennial; basal leaves at most 2·5 times longer than broad, cordate at the base; valves fringed with 3-5 spreading spiny teeth, one of them bearing an oblong tubercle; plants more or less hirsute below..........9. *R. obtusifolius*

e. Annual; basal leaves at most 2·5 times longer than broad; valves rhombic-oblong, lance-pointed, each bearing 2-3 awn-like bristles on each side, and a large grain on the back..........10. *R. persicarioides*

1. R. ACETOSA L. [Hs] Garden Sorrel

Fields (Mét.; For.; Bon. I.).

European: naturalized throughout temperate N.A.; possibly native northward (Alaska, Mack. R. Delta, Lab., and Nfld.); Iceland; Faeroes.

2. R. ACETOSELLA L. [Hsr] Field Sorrel. Sheep Sorrel

Slaty sea cliffs (Bic); limestone sea cliffs (Marsouins; Lou.); cliffs above lake (Lac Pleureuse); fields (Bic; Mét.; Mad.; St. Tharsicius); river gravels (Gnd.).

Eurasian: naturalized throughout N.A. from Alaska to Lab. and southward; Greenland; Iceland; Faeroes.

2a. R. ACETOSELLA, var. INTEGRIFOLIUS Wallr.; Rouy, Fl. de France 12: 81. 1910.

Slaty sea ridges (Bic); roadside (Val.).

Probably range of the species.

3. **R. pallidus** Bigel. [Hs] White Dock

Halophyte: salt marsh (Bic).

Psammophilous halophyte: sea beach (Bic; Mtn.; St. Omer).

Disjunct American (maritime): Aleutian Is., Alaska, Yukon, Mack. (Mack. R. Delta); Great Lakes region; e. Que. to Nfld., southw. to Me. and N.H.

4. **R. triangulivalvis** (Danser) Rech. f. [Hs] (*R. mexicanus* Fernald, not Weinm.)

Edge of pond (Zén.); r.r. ballast (Bon.).

Boreal circumpolar: B.C., Alb., Sask., Man., Ont., Que., s. Lab., and Nfld., southw. to S. Dak., Mo., Ohio, and Me., and in the Rocky Mts. to Mex.

5. **R. occidentalis** Wats. [Hs]

Halophyte: salt marsh (Bic; Mtn.; Gpe.; Jhn.; Gnd.; Bon.; Car.; Nou.).

Boreal American (essentially maritime): Alaska, Yukon, Mack. (Great Bear L., Great Slave L.), Hudson Bay (Churchill), to Lab. and Nfld., southw. to Calif., Utah, N. Mex., Tex., Ont., Que., and Me.

6. R. PATIENTIA L. [Hs] Patience Dock

Roadside (Bic); waste places (Car.).

Eurasian: naturalized sparingly in temperate N.A.

7. **R. orbiculatus** Gray. [Hs] (*R. Britannica* of Gray's Man., ed. 7; *See* Fernald, Rhod. 47: 133-137. 1945.) Great Water Dock

Wet places (Bic; Mtn.; Res.; Pcé.; Bon. I.; Gnd.; Bon.; PCa.; Car.).

(Boreal-)temperate eastern American: Ont. and Minn. to Côte Nord and Nfld., southw. to Kans., Ill., Ind., Ohio, and N.J.

8. R. CRISPUS L. [Hs] Curled Dock. Yellow Dock

Wet places (Lou.); fields (Bic; Car.).

Eurasian: naturalized throughout N.A. except in the extreme North.

9. R. OBTUSIFOLIUS L. [Hs] Broad-leaved Dock

Waste places (Bic; Rim.; Mét.; Gpe.; Pcé.; Bon. I.; Yrk.; Bon.; Res.).

European naturalized in N.A. from Alaska to Nfld., southw. to Mexico.

10. **R. persicarioides** L. [T] Golden Dock

Halophyte: brackish or saline places (Gaspe Peninsula); sandy beach (Pte. au Père).

Disjunct American (maritime): Oreg. and Calif.; Que., N.B., P.E.I., and Mass.

34. CHENOPODIACEAE
(Goosefoot Family)

a. Leaves with normal broad blades.
  b. Flowers perfect, mostly in panicled spikes, not enclosed between special bracts; calyx herbaceous, 3-5 parted.......................................1. *Chenopodium*
  b. Flowers unisexual.
    c. Calyx of pistillate flowers wanting; fruit enclosed between 2 appressed axillary bracts.. 2. *Atriplex*
    c. Calyx of both kinds of flowers 3-5 parted; staminate flowers minute, glomerate-spicate; fruit ebracteolate, oval or obovate, more or less winged at the top; leaves entire, narrowed at the base to a slender petiole..............3. *Axyris*

a. Leaves scale-like, subcylindric or spiny-subulate; plants fleshy; flowers perfect.
  b. Leaves scale-like, opposite; branches terete, succulent, jointed, green, turning red in autumn; flowers sunk in hollows of the axis of the fleshy spike, the calyx bladder-like; fruit pubescent; seed 1·3-2 mm. long................4. *Salicornia*
  b. Leaves linear, semicylindric (flat above), alternate, usually glaucous; fruiting calyx wingless .... 5. *Suaeda*
  b. Leaves subulate, spiny-tipped, alternate, stiffish; calyx with converging lobes forming a sort of beak over the fruit, the yellowish to lead-coloured wings nearly orbicular and spreading..6. *Salsola*

1. CHENOPODIUM (Tourn.) L.
(Goosefoot. Pigweed)

a. Calyx red, becoming fleshy in fruit; styles filiform; glomerules 10 mm. in diameter; seeds all vertical; leaves triangular and somewhat halberd-shaped, sinuate-toothed.. .... 1. *C. capitatum*

a. Calyx greenish, hardly fleshy in fruit; style-branches short.
  b. Leaves white-mealy beneath.
    c. Leaves or some of them mostly sinuate-toothed or lobed.
      d. Sepals strongly keeled in fruit; seeds all horizontal; stem erect; plant greyish...2. *C. album*
      d. Sepals not keeled in fruit; seeds sharp-edged, vertical and horizontal; stem more or less decumbent; plant reddish.........................3. *C. glaucum*
    c. Leaves small, entire, broadly ovate, on slender petioles nearly their own length, very fetid when crushed...4. *C. Vulvaria*
  b. Leaves green and glabrous or nearly so on both surfaces when mature; seeds all horizontal.
    c. Leaves large, bright green, thin, sharply few-toothed, abrupt or usually cordate at base.................................5. *C. hybridum*, var. *gigantospermum*
    c. Leaves longer than broad, cuneate at base.
      d. Sepals strongly keeled in fruit; seeds 1·3-1·5 mm. in diameter; flowers glomerate...2a. *C. album*, var. *viride*
      d. Sepals scarcely keeled; seeds about 1 mm. in diameter, sharp-edged; spikes or racemes diverging, somewhat corymbed.........................6. *C. murale*

1. **C. capitatum** (L.) Asch. [T] Strawberry Blite

Calcicole: sea cliffs and boulders (Bic); slaty beach (Mad.); wet places (Prr.); in a garden (Bon.); burned ground (Car.).

Boreal American: Alaska, Yukon, Mack. (Mack. R. Delta, Great Slave L.), James Bay to e. Que., southw. to n. Calif., Utah, Colo., Minn., Ill., Pa., and N.J.; introduced into Eurasia.

2. C. ALBUM L. [T] Lamb's Quarters. Pigweed

Dry fields (Bic; Irn.); sandy beach (Car.).

European: naturalized almost throughout N.A. except in the Far North; Iceland; Faeroes.

2a. C. ALBUM, var. VIRIDE (L.) Moq.

Gravelly bank (Mat.).

Range of the species.

3. C. GLAUCUM L. [T] Oakleaf Goosefoot

Railway ballast (Mat.); gravelly beach (Car.); waste places (Bic).

European: naturalized in temperate N.A.

4. C. VULVARIA L. [T] Stinking Goosefoot

Ballast-filling about fish-houses (Yrk.).

European: sparingly naturalized in temperate eastern N.A.

5. **C. hybridum** L., var. **gigantospermum** (Aellen) Rouleau. [T] (*C. gigantospermum* Aellen; *See* Rouleau, Nat. Canad. 71: 268. 1944; Fernald, Rhod. 51: 92. 1949.) Stinking Goosefoot

Limestone-conglomerate ridges (Bic); dry slaty talus above lake (Lac Pleureuse).

(Boreal-) temperate American: Yukon, Alb., n. Great Lakes region, and e. Que., southw. to n. Calif., Utah, N. Mex., Okla., Mo., Ind., and Va.; with the species, boreal circumpolar.

6. C. MURALE L. [T] Nettle-leaved Goosefoot

Ballast-filling about fish-houses (Yrk.).

European: naturalized throughout temperate N.A.

2. ATRIPLEX L.

(Orach)

a. Inflorescence without leafy bracts except at the base; seeds 1-2 mm. wide; bracteoles surrounding the flower 1-5 mm. long.
  b. Leaves lanceolate or oblong to linear, not hastate; bracts mostly narrowly rounded or broadly cuneate at the base.
    c. Blades of leaves lanceolate to oblong; bracteoles usually smooth on the inner face .... 1. *A. patula*
    c. Blades of leaves lanceolate to linear; bracteoles tubercled on the inner face.......... 1b. *A. patula,* var. *littoralis*
  b. Leaves in part triangular-hastate or squarish, with basal angles or lobes; bracts truncate or broadly rounded at the base.......... 1a. *A. patula,* var. *hastata*
a. Inflorescence leafy-bracted; leaves small; seeds 2-4 mm. wide; fruiting bracteoles 5-12 mm. long .... 2. *A. glabriuscula*

1. **A. patula** L. [T]

Halophyte: salt marsh (Pén.); sea cliffs within reach of salt spray (Pcé.); habitat not stated (Gnd.).

(Boreal-) temperate circumpolar (maritime): B.C. to James Bay, Côte Nord, and Nfld., southw. to Calif., Mo., Ala., and Fla.; Greenland (introd.); Iceland; Faeroes; Eurasia; n. Africa.

1a. **A. patula,** var. **hastata** (L.) Gray. (*A. hastata* L.)

Halophyte: brackish marsh (Pte. au Père).

Psammophilous halophyte: sea beach (Bic; Rim.; Ste. Luce; Fla.; Pén.; Car.). General in its habitat.

(Boreal-)temperate circumpolar (maritime): B.C., Wood Buffalo Park (Salt Plain), to Côte Nord and Nfld., southw. to Calif., Mo., Va., and S.C.; Greenland (introd.); Iceland; Faeroes; Eurasia; n. Africa; one of the maritime elements in the flora of the Great Lakes.

1b. **A. patula,** var. **littoralis** (L.) Gray (*A. littoralis* L.)

Halophyte: brackish marsh (Pén.).

Essentially the range of the above variety; one of the maritime elements in the flora of the Great Lakes.

2. **A. glabriuscula** Edmonston. [T]

Halophyte: salt marshes (Bic; St. Ulric); beach (Ren.).

Amphi-Atlantic (maritime): seashores from Nfld. to Me. and R.I.; Greenland; Iceland; Faeroes; northwestern Europe.

3. AXYRIS L.

1. A. AMARANTOIDES L. [T] Britton & Brown 2: 20. 1913.

In rubbish on beach (Gpe.).

Asiatic: adventive in temperate N.A. (Alb., Man., N. Dak., Miss.; occasional in northeastern N.A.).

4. SALICORNIA L.

(Samphire. Glasswort)

a. Plants erect, usually simple at the base; branches usually forming an acute angle with the stem ....1. *S. europaea*

a. Branches horizontally spreading or drooping, very soft and lax, the lowest much elongated and decumbent; or the whole plant depressed and matted ....1a. *S. europaea,* var. *prostrata*

1. **S. europaea** L. [T] (*S. herbacea* L.)

Halophyte: salt marshes (Bic; Bon.; Car.). General in its habitat.

Boreal circumpolar (maritime): Alaska, Mack., salt springs of the interior, Great Lakes region, Côte Nord, and Nfld., southw. along the coasts to B.C. and Ga.; Eurasia; one of the maritime elements in the flora of the Great Lakes.

1a. **S. europaea,** var. **prostrata** (Pall.) Fernald.

Halophyte: salt marshes (Bic; Drt.; Dou.; New Carlisle; Car.).

Probably range of the species.

5. SUAEDA Forsk.

(Sea Blite)

a. Lower leaves up to 5 cm. long, acute or obtuse; calyx deeply cleft, the lobes rounded at the apex, rounded or obscurely keeled on the back; seeds 2 mm. broad, reddish black; plant glaucous ....1. *S. maritima*

a. Lower leaves about 2 cm. long, acute; sepals very irregular, 1 or 2 of them cucullate-keeled; seeds 1-1·5 mm. broad, black; plant dark green, not glaucous..2. *S. americana*

1. **S. maritima** (L.) Dumort. [T]

Halophyte: salt marshes and tidal flats (Bic; Bon.; Car.; Nou.).

(Arctic-)boreal circumpolar (maritime): Alaska, arctic coast of N.W.T., Great Bear L., to e. Que., southw. to Oreg. and N.J., and occasionally to La.; n. Africa; Eurasia.

2. **S. americana** (Pers.) Britton. [T]

Halophyte: brackish marsh at river mouth (Bon.) (type station).

Temperate eastern American (maritime): e. Que. to Me.

6. SALSOLA L.
(Saltwort)

1. **S. Kali** L. [T]

Psammophilous halophyte: sea beach (Bic; Fla.; Trl.; Gpe.; Mal.; Bon.; Pas.; Car.). General in its habitat.

(Boreal-)temperate circumpolar (maritime): gap in western N.A.; e. Que., Mingan Is., and Nfld., southw. along the coast to Miss.; saline places inland; Eurasia.

35. AMARANTHACEAE
(Amaranth Family)

1. AMARANTHUS (Tourn.) L.

a. Flowers in dense contracted panicles terminating the branches; stamens and sepals 5; leaves large, undulate, ovate-lanceolate..............................1. *A. retroflexus*

a. Flowers in axillary clusters; stamens and sepals 1-3; seeds 0·6-0·8 mm. wide; utricle rugose; leaves small, spatulate, those toward the ends of the branches much reduced..2. *A. graecizans*

1. A. RETROFLEXUS L. [T] Pigweed. Green Amaranth

Waste places (Bic).

Tropical American: widely distributed throughout N.A.

2. **A. graecizans** L. [T] (*A. blitoides* of Gray's Man., ed. 7.) Tumbleweed

Railway ballast (New Carlisle).

Temperate American: widely distributed except in the extreme north; appearing as though adventive from the west or the south.

36. CARYOPHYLLACEAE
(Chickweed Family)

a. Calyx with sepals distinct, or united only at the base.
  b. Stipules present, scarious.
    c. Styles and capsule valves 3; leaves linear, opposite; stipules scaly-membranaceous..1. *Spergularia*
    c. Styles and capsule valves 5; leaves filiform, whorled, 2-5 cm. long; stipules minute; seeds roughened with minute whitish papillæ; plant bright green..2. *Spergula*

b. Stipules wanting.
  c. Capsule splitting into valves.
    d. Leaves linear-filiform; styles alternate with the sepals; petals entire, shorter than the sepals or wanting; low, tufted plants......................3. *Sagina*
    d. Leaves linear or broader; styles opposite some or all of the sepals.
      e. Petals entire or merely emarginate.............................4. *Arenaria*
      e. Petals 2-cleft, rarely none.....................................5. *Stellaria*
  c. Capsule opening by twice as many short apical teeth as styles, often curved; petals notched or 2-cleft...6. *Cerastium*

a. Calyx with a well-marked tube, 5-toothed or cleft, naked at base; seeds globular or reniform.
  b. Flowers apetalous, sessile in the forks; leaves awl-shaped; plant much branched and spreading...7. *Scleranthus*
  b. Flowers with petals.
    c. Sepals with long herbaceous tips 2-3 cm. long; styles 5, opposite the petals; petals purplish red, spotted with black...........................8. *Agrostemma*
    c. Sepal lobes less than 2 cm. long; styles alternate with the petals.
      d. Styles 5...9. *Lychnis*
      d. Styles 3...10. *Silene*
      d. Styles 2...11. *Saponaria*

a. Calyx tubular, subtended by 4 bracts; seeds dorsally flattened...........12. *Dianthus*

1. SPERGULARIA Pers.
(Sand Spurry)

[Rossbach: Spergularia in North and South America; Rhodora 42: 57-83, 105-143, 158-193, 203-213. 1940.]

a. Stamens 6-10; styles 0·6-0·8 mm. long; seeds dark brown, deeply sculptured in closely interwoven vermiform pattern with minute dark, hard papillæ, 0·4-0·6 mm. long, not winged; leaves densely fascicled, linear-filiform, strongly mucronate, scarcely fleshy; stipules triangular-acuminate, conspicuous by the numerous shining ones at a node, usually 3·5-5 mm. long...1. *S. rubra*

a. Stamens 2-5; styles 0·3-0·6 mm. long; seeds 0·6-1·4 mm. long, often winged; leaves very fleshy; stipules deltoid, usually as long as or shorter than broad, usually less than 3 mm. long.
  b. Seeds large, 0·9-1·4 mm. long, brown, often entirely or partly surrounded by a white erose wing about 0·3 mm. wide, or wingless, the surface nearly smooth or with minute and irregular reticulate thickenings, very often with long, delicate, glandular pubescence, especially on the swollen rim at the summit; styles 0·3-0·4 mm. long; stipules 1-2·8 mm. long; leaves blunt.................2. *S. canadensis*
  b. Seeds 0·6-0·8 mm. long, smooth or papillose, usually not winged, brown to deep reddish brown; styles 0·4-0·6 mm. long; stipules 2-4 mm. long; leaves bluntly mucronate...3. *S. marina*

1. S. RUBRA (L.) J. & C. Presl. [T]

Calcicole: sea cliffs (Bic; Anse à l'Ours).
Halophyte: salt marshes (Rim.; Yrk.; Newport; New Richmond).
Psammophilous halophyte: sandy beaches (Gpe.; Car.).
European: naturalized throughout temperate N.A.

2. **S. canadensis** (Pers.) G. Don. [T]

Halophyte: salt marshes and tidal flats (Bic; Pte. au Père; Ste. Luce; Mét.; Mtn.; Cap.; Ann.; Tng.; Drt.; Yrk.; Jhn.; Dou.; Pas.; New Carlisle; Car.; Res.).

Disjunct American (maritime): s. coast of Alaska and the Queen Charlotte Islands; e. Que., Lab., and Nfld. to Long Island, N.Y.

3. **S. marina** (L.) Griseb. [T] (*S. salina* J. & C. Presl)

Halophyte: salt marshes (Bic; Yrk.) (plants with papillose seeds); damp hollows, gravelly beach (Car.) (plants with smooth seeds, separated by Fernald and Wiegand as *S. leiosperma,* Rhod. 12: 162. 1910; 42: 133-134. 1940).

Temperate circumpolar (maritime): B.C. and Mack. to Côte Nord, southw. to Calif. and Fla. (alkaline places in the interior); S.A.; Eurasia.

2. SPERGULA L.

(Corn Spurry)

1. S. ARVENSIS L. [T]

Grain fields (Bic; Rim.; Mét.; Mtn.; Bon. I.; Yrk.; Mar.; Mat.; Irn.).

European: naturalized throughout N.A. from Alaska to Nfld., southw. to Calif. and S.C.

3. SAGINA L.

(Pearlwort)

a. Parts of the flowers in 4's; petals shorter than the sepals, sometimes wanting; flowers about 2 mm. broad; apex of peduncle often hooked after flowering; leaves not fascicled.

  b. Stems depressed or spreading; peduncles longer than the leaves....1. *S. procumbens*

  b. Dwarf plants, the stems densely caespitose; peduncles short...1a. *S. procumbens,* var. *compacta*

a. Parts of the flowers in 5's; stems erect, tufted.

  b. Upper leaves very short, proliferous in their axils; flowers about 6 mm. broad; petals twice as long as the pointed sepals............................2. *S. nodosa*

  b. Leaves not fascicled; flowers 3-5 mm. broad; sepals very obtuse, 1·5-2 mm. long, longer than the petals..3. *S. saginoides*

1. **S. procumbens** L. [Hsr]

Calcicole: sea ledges (Bic; Mét.; For.; Pcé.); river ledges and gravels (Ren.; Yrk.); wet places (R. Blanche; Val.; Anse aux Canards).

Halophyte: sea ledges within reach of salt spray (Bic; Anse Jersey); clay beach (Mar.); sandy beaches (Gpe; New Carlisle).

Boreal circumpolar (essentially maritime): Aleutian Is., B.C., and Wash.; gap in continental western N.A.; Mich. to s. Lab. and Nfld., southw. to Del.; Greenland; Iceland; Faeroes; Eurasia.

1a. **S. procumbens,** var. **compacta** Lange, Meddel. om Groenland 3: 242. 1887.

Calcicole: sea cliffs (Bon. I.).

"The arctic extreme of the species, not previously recorded from south of Greenland" (Fernald, in Rhod. 44: 127. 1942).

2. **S. nodosa** (L.) Fenzl. [Hs]

Calcicole: sea ledges (Bic; Trl.; Pcé.); river gravels (Yrk.).

Halophyte: salt marshes and shores (Mtn.; Ann.; Manche d'Epée; Val.; Mal.; Dan.; Bon.; Nou.).

Psammophilous halophyte: sea beach (Bic; Car.).

Arctic circumpolar (maritime): shores of Arctic Ocean eastward of Mack. R., Great Bear L., Keewatin, s. Baffin, Lab., southw. to the Great Lakes region and Me.; Greenland; Iceland; Eurasia.

3. **S. saginoides** (L.) Britton. [Ch (cushion)] (*S. Linnaei* Presl) Rydberg, p. 279.

Damp soil in alpine ravines (Alb.; Tbl.).

Arctic ?circumpolar, alpine: Aleutian Is., Alaska, Yukon, sw. Mack., southw. to s. Calif., Mont., and Colo.; n. Keewatin (Wager Bay), Akpatok I., n. Lab., and Gaspe Peninsula; w. and e. Greenland; Iceland; Faeroes; arctic and alpine Eurasia.

4. ARENARIA L.

(Sandwort)

a. Plant fleshy, maritime; flowers with a prominent 8-10-lobed glandular disk under the ovary, few, axillary or from the upper forks, on short thick pedicels; seeds dark brown, distinctly papillose.............................1. *A. peploides*, var. *robusta*

a. Plants scarcely fleshy; disk of flowers inconspicuous or none.

b. Seeds few, with a basal membranous appendage (strophiole) at the hilum; leaves 3-15 mm. broad.

c. Stem terete; leaves oblong or oval, usually obtuse; sepals obtuse or acute, shorter than the petals...2. *A. lateriflora*

c. Stem angled; leaves lanceolate, usually acute; sepals acuminate, longer than the petals...3. *A. macrophylla*

b. Seeds many, naked at the hilum; leaves narrower; stems tufted.

c. Valves of the capsule 2-cleft, sometimes appearing as if double the number of the styles.

d. Sepals lanceolate, acuminate, 3-5-nerved, scarious-margined; leaves ovate, small, acute...4. *A. serpyllifolia*

d. Sepals oblong, obtuse or subacute, nerveless or obscurely 1-nerved; leaves lanceolate to oblong, subacute...............................5. *A. humifusa*

c. Valves of capsule entire; leaves linear.

d. Leaves rigid, subulate or setaceous.

e. Sepals lanceolate, acuminate.

f. Lateral nerves of the leaves none or much smaller than the midrib; leaves firm, commonly proliferous in the axils; stems 6-14 cm. high, tufted but diffuse; sepals 3-nerved; capsule 5 mm. long, well exserted at maturity..6. *A. dawsonensis*

f. Leaves with 3 nearly equal nerves, somewhat triquetrous; stems 2-12 cm. high; plant glandular-puberulent.............................7. *A. rubella*

e. Sepals oblong or oblong-lanceolate, obtuse; alpine plants.

The few short filiform herbaceous or subherbaceous basal shoots bearing obscurely keeled leaves; petals 0·5-1 mm. wide, shorter than to barely exceeding the glabrous or puberulent sepals; anthers 0·2-0·3 mm. long; capsule 4-6 mm. long, with membranaceous pale valves; seeds smooth, reniform-orbicular, not obviously beaked, 0·6-0·8 mm. in diameter..8. *A. sajanensis*

The crowded, trailing, freely forking, subligneous branches densely clothed with highly marcescent thick-ribbed leaves; petals 1·5-2·5 mm. wide, conspicuously exceeding the pilose or hirsute sepals; anthers 0·5-1 mm. long; capsule 6-10 mm. long, with firm stramineous valves; seeds reniform-obovate, with the micropyle prolonged into a beak, 0·7-1·2 mm. long..9. *A. marcescens*

d. Leaves flaccid, linear-filiform, obtuse, the upper distant, the lower matted, 3-15 mm. long; stems tufted, filiform, 5-20 cm. high, erect, glabrous; petals obovate, commonly retuse, about twice as long as the oblong nerveless sepals...10. *A. groenlandica*

1. **A. peploides** L., var. **robusta** Fernald, Rhod. 11: 114. 1909. [Grh] Sea Sandwort

Psammophilous halophyte: sea beaches (Bic; Pte. au Père; Fla.; Mét.; Cap.; Ann.; Trl.; Srl.; Lou.; Ren.; Cha.; Newport).

Boreal eastern American (maritime): s. Lab. and Nfld. to N.J.; reported southward to Va.; the whole species boreal circumpolar.

2. **A. lateriflora** L. [Hpr] *See* St. John, Rhod. 19: 259-262. 1917.

Sea ridges (Bic; R. Blanche; Marsouins); sea beaches (Fla.; Mét.; Trl.; Dou.; Pas.; Car.; Esc.); wet places (Pcé.; Bon. I.; St. Omer).

Boreal circumpolar: Aleutian Is., Alaska, Yukon, Mack. (Mack. R. Delta, Great Bear L.), Hudson Bay (Churchill), James Bay, s. Lab., and Nfld., southw. to Mo., Ill., Ohio, Pa., and N.J., and in the mts. to N. Mex.; Eurasia (gap in western Europe).

3. **A. macrophylla** Hook. [Hpr]

Sea cliffs (Bic); moist ground (Lac Matane); alpine cliffs (Log.; Pem.).

Disjunct American: B.C. and Mack. (Great Slave L.) to Calif. and N. Mex.; Great Lakes region; n. Lab. to Vt.; Altai Mts.

4. A. SERPYLLIFOLIA L. [T] Thyme-leaved Sandwort

River banks 8 miles from mouth (Ann.).

Eurasian: naturalized throughout temperate N.A.

5. **A. humifusa** Wahl. [Ch(cushion)] (*A. ciliata,* var. *humifusa* Robinson; *A. cylindrocarpa* Fernald, Rhod. 16: 43. 1914; *See* Polunin, Nature 152: 451-452. 1943.)

Alpine serpentine barrens and talus slopes (Alb.); wet alpine cliffs (Log.; Mtt.; Col.).

Arctic circumpolar, alpine: western and central Alaska, Yukon, Mack. (Mack. R. Delta, Great Bear L.), Boothia Pen., w. and e. coasts of Hudson Bay, Ellesmere, Baffin, n. Lab., and Nfld., southw. in the mts. of B.C. and Gaspe; n., w., and s. Greenland; Spitsbergen; arctic Scandinavia (relict).

6. **A. dawsonensis** Britton. [Ch (cushion)] (*A. litorea* Fernald.)

Calcicole: cliffs at south foot of Bic Mt. (Bic); river ledges and gravels (Ann.; Drt.; Yrk.; Bon.; PCa.); gravel spit (Car.).

Boreal American: Alaska, Yukon, Mack. (Great Bear L., Great Slave L.), James Bay, e. coast of Hudson Bay, n. Que., s. Lab., and Nfld., southw. to S. Dak., the Great Lakes, and e. Que.

7. **A. rubella** (Wahl.) Sm. [Ch(cushion)] (*A. verna,* var. *propinqua* Fernald, Rhod. 8: 32. 1906; *A. verna,* var. *pubescens* (Cham. & Schl.) Fernald.)

Calcicole: sea cliffs (Bic; Lbn.; For.; Pcé.; Bon. I.); alpine schists (Log.; Mtt.; Ftn.; Pem.).

Alpine serpentine barrens (Alb.).

Arctic circumpolar, alpine: Alaska, Yukon, Mack., King William I., Melville, Devon, Ellesmere, n. Baffin, n. Lab., and Nfld., southw. in the mts. to Calif. and Gaspe; w., n., and e. Greenland; Iceland; Faeroes; Spitsbergen; arctic and alpine Eurasia; mts. of n. Africa.

Forma *epilis* (Fernald) Polunin, the whole plant glabrous, has been collected from limestone detritus at the crest of sea cliffs at Percé, the type station, and in serpentine crevices of Mount Albert.

8. **A. sajanensis** Willd. [Ch(cushion)] *See* Fernald, Rhod. 21: 13. 1919.

Calcicole: alpine schists (Bln.).

Alpine serpentine barrens and brook ravines (Alb.).

Arctic circumpolar, alpine: Alaska, Yukon, Mack. (Mack. R. Delta, Great Bear L.), Keewatin, Melville, Baffin, n. Que., and n. Lab., southw. in the mts. to Oreg., Ariz., and Gaspe; Greenland; Spitsbergen; arctic and alpine Eurasia.

9. **A. marcescens** Fernald, Rhod. 21: 15. 1919 [Ch(cushion)]

Alpine serpentine barrens and brook ravines (Alb.) (type station).

Gulf endemic, alpine: serpentine barrens of Gaspe and Nfld.; magnesian limestone barrens, Nfld.

10. **A. groenlandica** (Retz.) Spreng. [Ch(cushion)] *See* Fernald, Rhod. 21: 20. 1919.

Calcicole: alpine schists of Mt. Richardson (Tbl.).

(Arctic-)boreal eastern American, alpine: n. Lab., southw. in the mts. to N.Eng., N.Y., and N.C.; Greenland.

5. STELLARIA L.

(Chickweed. Starwort)

a. Leaves relatively broad, ovate or oblong.
  b. Stems glabrous, purplish, spreading or creeping, 2-8 cm. long; leaves fleshy, ovate, 4-6 mm. long; petals a little longer than the sepals..................1. *S. humifusa*
  b. Stems with 1 or 2 pubescent lines; leaves larger, ovate to oblong, the lower on hairy petioles of nearly their own length; petals shorter than the sepals..2. *S. media*
a. Leaves narrow, linear or narrowly lanceolate.
  b. Bracts of the cyme small, scarious.
    c. Pedicels widely spreading; cyme diffuse, scaly-bracted.
      d. Leaves linear, acute at each end, 2-6 cm. long; cymes at length lateral; seeds smooth, shining ....3. *S. longifolia*
      d. Leaves lanceolate, broadest below, 2-3 cm. long; cyme terminal; seeds strongly but minutely roughened ....4. *S. graminea*
    c. Pedicels erect; branches 2·5-15 cm. high, 1-3-flowered; pods exserted, shining, nearly black; leaves erect, rigid, keeled, lanceolate to ovate-lanceolate; plant glabrous or somewhat pubescent to very glaucous ....5. *S. longipes*
  b. Bracts of the cyme foliaceous, resembling the upper leaves.
    c. Seeds rough; petals equalling or longer than the sepals; leaves rather fleshy, oblong-lanceolate, acutish ....6. *S. crassifolia*
    c. Seeds smooth; petals minute or none.
      d. Mature calyx 2-3·5 mm. long; mature capsule 3-5 mm. long.
        e. Leaves ovate, ovate-lanceolate or elliptic-lanceolate, the primary ones 0·7-2·5 cm. long..7. *S. calycantha*
        e. Leaves lanceolate to lance-linear, the primary ones 2·5-5·5 cm. long.
          f. Upper leaves long and only slightly reduced, herbaceous throughout; flowers few, axillary and terminal ....7a. *S. calycantha*, var. *isophylla*
          f. Upper leaves much reduced to short scarious-margined bracts; flowers numerous in terminal cymes ....7b. *S. calycantha*, var. *floribunda*

d. Mature calyx 4·5-5 mm. long; mature capsules 5-6 mm. long; seeds 0·7-0·9 mm. long; leaves lanceolate, the primary ones 3-7 cm. long...7c. *S. calycantha,* var. *laurentiana*

1. S. **humifusa** Rottb. [Ch(passive)] Low Chickweed

Halophyte: salt marshes (Bic; Ann.; Trl.; Ren.; Drt.; Nou.).

Psammophilous halophyte: wet rocks by the sea (Bic); gravels at river mouth (Yrk.); sea beach (Car.).

Arctic circumpolar (maritime): Aleutian Is., n. coast of Alaska, Coronation Gulf, Victoria Strait, Hudson Bay, Melville, Devon, Ellesmere, Baffin, n. Lab., southw. along the coasts to Oreg. and Me.; w., n., and e. Greenland; Iceland; Spitsbergen; arctic Eurasia.

2. S. MEDIA (L.) Cyrill. [T] Common Chickweed

Sea cliffs (Lou.; Clr.); fields (Bic; New Richmond; St. Tharsicius); gravel beaches (Mét.; Mtn.; Pas.).

Eurasian: naturalized nearly throughout N.A., northward to Lake Athabasca; Greenland (introd.).

3. **S. longifolia** Muhl. [Ch(passive)] Long-leaved Starwort

Calcicole: sea cliffs (Bic; Trl.; Marsouins).

Boreal circumpolar: Alaska, Mack. (Great Slave L.), James Bay, Lab., and Nfld., southw. to Utah, N. Mex., La., Ky., and Md.; Eurasia.

4. S. GRAMINEA L. [Hpr] Lesser Starwort

Fields (Rim.; Irn.); rocks by sea (Bic); road in woods (Drt.); brackish meadow (Gpe.).

Eurasian: naturalized in N.A. from Minn. to Nfld., southw. to Md.

5. **S. longipes** Goldie. [Ch (passive)]

Calcicole: sea cliffs (Bic; Trl.; Mrn.; Mad.; Pcé.; Bon. I.; Cha.); calcareous gravels of spits (Pas.; Car.; Nou.); mossy alpine schists (Log.); alpine slopes (Tbl.) (distributed as *S. florida* Fisch.).

Arctic circumpolar, alpine: n. coast of Alaska, Yukon, Mack. (Mack. R. Delta, Great Bear L., Coronation Gulf), Melville I., s. Ellesmere, Devon, n. and s. Baffin, Hudson Bay (Chesterfield Inlet, Southampton I., Hudson Str.), n. Lab., and Nfld., southw. to Calif., N. Mex., Sask., the Great Lakes, e. Que., and the Magdalen Islands; w. and e. Greenland; Spitsbergen; arctic and alpine Eurasia.

The Gaspe plants seem to be referable chiefly to var. *laeta* (Richards.) Wats., although Raup (Sargentia 6: plate 23. 1947) records var. *Edwardsii* (R. Br.) Wats. from Gaspe. For a discussion of these *See* Polunin, Nat. Mus., Canada, Bull. 92: 192. 1940; Hultén, Fl. Alaska and Yukon, p. 656. 1944; Raup, l.c., p. 169, 1947. The plant with no scarious bracts, the flowers in the axis of normal stem-leaves, which was collected by Fernald's party between Mounts Logan and Pembroke, is treated by Hultén (Botaniska Notiser 1943, p. 265) as a distinct species, *Stellaria monantha* Hultén.

6. **S. crassifolia** Ehrh. [Hp]

Halophyte: tidal marshes at river mouth (Bon.).

Psammophilous halophyte: sea beach (Bic).

Arctic circumpolar (maritime): Bering I., Alaska, Yukon, Mack. (Mack. R. Delta, Great Bear L.), Southampton I., s. Baffin, n. Lab., and Nfld., southw. to Colo. and Pa.; Greenland; Iceland; arctic Eurasia.

7. **S. calycantha** (Ledeb.) Bongard. [Hpr] (*S. borealis* Bigel.; *See* Fernald, Rhod. 16: 150. 1914; 42: pl. 602. 1940.)

Calcicole: sea ledges (Bic; Lou.; Clr.); edge of river (Dou.); alpine cliffs (Ftn.; Lyl.; Bln.); subalpine meadows and woods (Alb.; Tbl.; Log.).

(Arctic-)boreal circumpolar, alpine: Aleutian Is., Alaska, Yukon, Mack. (Mack. R. Delta, Great Bear L.), s. Hudson Bay, n. Lab., and Nfld., southw. to Oreg. and N.J.; Greenland; Iceland; arctic and alpine Eurasia.

7a. **S. calycantha,** var. **isophylla** Fern. (*S. borealis,* var. *isophylla* Fern., Rhod. 16: 150. 1914; *See* Rhod. 42: 255. 1940.)

Calcicole: sea cliffs (Bic; Lou.; Mad.; Clr.); river ledges (Ren.); cedar swamps (Gnd.; Car.); alpine meadow (Bln.).

Boreal American: Alaska to Lab. and Nfld., southw. to Utah and Pa.

7b. **S. calycantha,** var. **floribunda** Fern. (*S. borealis,* var. *floribunda* Fern.; *See* Rhod. 16: 144-151. 1914; 42: 255. 1940.)

Calcicole: sea cliffs (Bic; Trl.; Prr.; Lou.); river ledges (Ren.; Dou.); moist ground (Clr.; Car.); subalpine meadow (Tbl.).

(Boreal-)temperate American: B.C. to James Bay and Nfld., southw. to Minn. and N.Y., and the mts. of Utah.

7c. **S. calycantha,** var. **laurentiana** Fernald, Rhod. 42: 254. 1940.

Calcicole: sea cliffs (Bic; Srl. (type station)). The basis of Gaspe citations of the western var. *Bongardiana.*

Gulf endemic: e. Que. and Anticosti I.

6. CERASTIUM L.

(Mouse-ear Chickweed)

a. Petals shorter than or only slightly exceeding the sepals.
  b. Stems viscid-pubescent, 1·5-4·5 dm. long; leaves oblong to spatulate-oblong; petals about equalling the sepals, these about 4-6 mm. long, obtusish...1. *C. vulgatum,* var. *hirsutum*
  b. Stems glandular-pilose, 0·4-2 dm. long; leaves linear to elliptic-oblong; petals 6-8 mm. long, only slightly exceeding the sepals............3. *C. Beeringianum*
a. Petals distinctly longer than the sepals.
  b. Styles 5; leaves acute to acutish.
    c. Leaves linear or linear-lanceolate, acute; petals more than twice the length of the calyx..2. *C. arvense*
    c. Leaves lanceolate to lance-oblong, acutish; sepals 4·5-7·5 mm. long; petals 0·9-1·2 mm. long........................3a. *C. Beeringianum,* var. *grandiflorum*
  b. Styles 3 (very rarely 4 or 5); leaves linear-oblong; petals twice the length of the sepals; capsule twice the length of the calyx................4. *C. Cerastioides*

1. C. VULGATUM L., var. HIRSUTUM Fries. [Ch (active)] (*C. vulgatum* of Gray's Man., ed. 7.) Common Mouse-ear

Sea cliffs (Bic; Lou.; Pcé.); river gravels (Ann.; Mat.); roadside (Mad.); fields (Mét.; Trl.; Bon.; Mar.; Irn.).

European: naturalized throughout N.A. from Alaska to Lab. and southward; Greenland.

2. **C. arvense** L. [Ch (passive)] Field Mouse-ear

Sea cliffs (Bic; Trl.; Srl.; Marsouins; For.; Pcé.; Bon. I.); river gravels (Ann.; GCa.).

Alpine serpentine barrens (Alb.); gravel outwash plain below Mt. Albert (R. du Diable); subalpine rocks (Log.; Pem.). General. The plant of lawns and fields is probably naturalized from Europe.

(Arctic-)boreal circumpolar, alpine: Alaska, Yukon, Mack. (Mack. R. Delta, Great Bear L.), James Bay, n. Lab., and Nfld., southw. to Calif., Colo., S. Dak., Minn., Ind., and Del., and in the mts. to Ga.; w. Greenland; n. Eurasia.

3. **C. Beeringianum** Cham. & Schl. [Ch (passive)] (*C. alpinum*, var. *Beeringianum* (Cham. & Schl.) Regel; *See* Fernald and Wiegand, Rhod. 22: 172-173. 1920.)

Calcicole: sea cliffs and talus (Bic; Trl.; Srl.; Marsouins; Prr.; For.; Pcé.; Bon. I.); alpine cliffs (Tbl.; Log.; Mtt.; Bln.).

Arctic American, alpine: Aleutian Is., Alaska, Yukon, Herschel I., Mack. (Mack. R. Delta, Great Bear L.), Keewatin, ?s. Baffin, n. Lab., and Nfld., southw. to Alb.; e. Que.; e. Asia.

3a. **C. Beeringianum,** var. **grandiflorum** (Fenzl) Hultén.

Calcicole: sea cliffs and talus (Ros.; Pcé.; Bon. I.); alpine schists (Tbl.; Bln.).

Probably the range of the species.

According to Hultén (Fl. Alaska and Yukon, 1944, p. 665), "This variety has often been taken to be *C. Fischerianum* Sér. which, however, is quite a different plant. If we take the entire material from Alaska and Yukon it seems that the main form grades gradually into var. *grandiflorum*...".

4. **C. Cerastioides** (L.) Britton. [Ch (passive)] (*C. trigynum* Vill.)

Calcicole: alpine schists (Log.); subalpine meadow (Tbl.).

(Arctic-)boreal circumpolar, alpine: gap in western N.A.; islands in Hudson Bay; n. Lab. and Nfld., southw. in the mts. to Gaspe; Greenland; Iceland; Faeroes; arctic and alpine Eurasia.

7. Scleranthus L.

(Knawel)

1. S. ANNUUS L. [T]

Sandy places (Rim.).

European: naturalized throughout temperate eastern N.A.

8. Agrostemma L.

(Corn Cockle)

1. A. GITHAGO L. [T]

Grain field (Cap Chat; Trl.; Car.).

Eurasian: introduced throughout temperate N.A.

9. LYCHNIS L.
(Campion)

a. Flowers white (sometimes pinkish), in an open cyme; capsule ovoid-conical, narrow-mouthed at dehiscence; stem uniformly leafy, viscid-pubescent..........1. *L. alba*

a. Flowers pink, in a terminal cyme 1-2·5 cm. broad; calyx campanulate, 4 mm. long, its teeth short and rounded; basal leaves densely tufted, narrowly oblanceolate or linear, 2-4 mm. wide....................................2. *L. alpina*, var. *americana*

1. L. ALBA Mill. [Hs] White Campion

Fields (Mtn.).

European: introduced in temperate eastern N.A.

2. **L. alpina** L., var. **americana** Fernald, Rhod. 42: 259. 1940. [Hs] Red Alpine Campion

Alpine serpentine barrens (Alb.); gravel outwash plain below Mt. Albert (R. du Diable).

(Arctic-)boreal eastern American, alpine: e. Que., n. Lab., and Nfld.; w., s., and e. Greenland; with the species, arctic circumpolar.

Var. *americana*, forma *albiflora* (Lange) Fernald, with white flowers (Rhod. 42: 259. 1940), has been collected on the serpentine barrens of Mt. Albert.

10. SILENE L.

a. Dwarf, densely tufted arctic-alpine species; flowers 8-12 mm. broad, solitary, usually sessile, purple or purplish; leaves crowded, linear, 8-12 mm. long, the margins ciliate-serrulate..1. *S. acaulis*

a. Erect or ascending herbs; flowers cymose, peduncled, white.
  b. Calyx globular, much inflated, obscurely ribbed but with a network of delicate veins, the teeth deltoid; plant glabrous or glaucous.............2. *S. Cucubalus*
  b. Calyx tubular, not inflated except by the enlarging capsule, longitudinally ribbed, the teeth awl-shaped; plant glandular-pubescent, night-flowering..3. *S. noctiflora*

1. **S. acaulis** L. [Ch (cushion) Evergreen] (*See* Fernald and St. John, Rhod. 23: 119-120. 1921.) Moss Campion

Alpine serpentine barrens (Alb.); gravel outwash plain below Mt. Albert (R. du Diable); bare alpine summits and slopes (Tbl.; Log.; Mtt.; Ftn.; McNab). (All var. *exscapa* (All.) DC.)

Arctic circumpolar, alpine: Alaska, Yukon, Mack. (Mack. R. Delta, Great Bear L., Coronation Gulf), Banks I., Victoria I., Melville I., King William I., Somerset I., Sverdrup I., Ellesmere, Devon, n. and s. Baffin, Melville, n. Lab., and Nfld., southw. in the mts. to Mont. and N.H.; w. and e. Greenland; Iceland; Faeroes; Spitsbergen; arctic and alpine Europe; e. Asia.

2. S. CUCUBALUS Wibel. [Hpr] Bladder Campion

Slaty field (Bic); sea cliffs (Prr.; Val.); river gravels (Mtn.; Drt.; Yrk.; Jhn.; Bon.; GCa.; Mat.); gravel beach (Car.).

Eurasian: naturalized throughout temperate N.A.

3. S. NOCTIFLORA L. [T] Night-flowering Catchfly

Dry banks of river estuary (Bon.); fields (Rim.; Trl.; Gpe.; Dou.; GCa.).

European: naturalized throughout temperate N.A.

11. SAPONARIA L.

1. S. VACCARIA L. [T] Cow Herb. Soapwort

Roadside (Mat.); cultivated fields (Rim.).

European: adventive throughout temperate N.A.

12. DIANTHUS L.

1. D. BARBATUS L. [Hp] Sweet William

Escaped from gardens (Bic; Trl.); washed down from a camp to alluvium near river mouth (Ann.).

European: cultivated and sparingly spontaneous.

37. PORTULACACEAE

(Purslane Family)

a. Leaves numerous, 6-12 mm. long; stem prostrate, branching and rooting at the nodes, 2-10 cm. long; flowers small, white; petals 3; stamens 3; annual with fibrous roots...1. *Montia*

a. Leaves few, 7-15 cm. long; stem unbranched, 15-30 cm. long; flowers larger, rose-colour with deeper veins; petals 5; stamens 5; perennial from a deep tuberous root...2. *Claytonia*

1. MONTIA (Mich.) L.

(Water Chickweed)

1. **M. lamprosperma** Cham. [T]

Swampy soil (Bic; Baie des Sables; Ann.; Trl.; Drt.; Pcé.; Bon.; Nou.).

Arctic circumpolar: Alaska to B.C.; Hudson Bay (Chesterfield Inlet, Hudson Str.), s. Baffin, n. Lab., and Nfld., southw. to Me.; w. and se. Greenland; Iceland; Faeroes; Europe; e. Asia.

2. CLAYTONIA (Gronov.) L.

(Spring Beauty)

1. **C. caroliniana** Michx. [Gst]

Woods (Rim.; Cap d'Espoir; Mat.); subalpine woods (Log.; Mtt.; Ftn.) (including specimens erroneously distributed as var. *sessilifolia* Torr.).

Temperate American: Sask. to Côte Nord and e. Que., southw. to Ohio and Mo., and in the mts. to N.C. and Ga.

38. NYMPHAEACEAE

(Water Lily Family)

a. Leaves oval, centrally peltate; flowers purple, small, 10-12 mm. in diameter; sepals and petals each 3-4; carpels 4-18, separate; plant covered with gelatinous matter...1. *Brasenia*

a. Leaves oval or orbicular, cordate; flowers large; sepals 4-6; petals many, in several rows; ovary 1, 8-30-celled.
  b. Petals white, showy; petals and stamens inserted on the sides and near the summit of the ovary...2. *Nymphaea*
  b. Petals yellow, inconspicuous; petals and stamens inserted below the ovary..3. *Nuphar*

1. BRASENIA Schreb.

(Water Shield)

1. **B. Schreberi** Gmel. [HH]

Waters of marly pond (Oie).

Temperate circumpolar: Alaska to Calif. and Idaho; gap in continental western N.A.; Man. to e. Que., southw. to Tex. and Fla.; Mexico; Central America; Eurasia; S. Africa; Australia.

2. NYMPHAEA L.

(Water Lily)

a. Flowers 7-15 cm. broad, fragrant; leaves orbicular, 1-3 dm. broad, purplish beneath ....1. *N. odorata*

a. Flowers 2·5-4 cm. broad, not fragrant; leaves oval or oblong, 5-10 cm. long, green or purplish beneath.................................2. *N. tetragona,* subsp. *Leibergi*

1. **N. odorata** Ait. [HH] White Water Lily

Ponds (Lac Mont Louis; New Carlisle).

(Boreal-)temperate American: Man. to e. Que. and Nfld., southw. to Tex., La., and Fla.

2. **N. tetragona** Georgi, subsp. **Leibergi** (Morong) A. E. Porsild; *See* Can. Field Nat. 53: 48-50. 1939. [HH] (*Castalia tetragona leibergii* Cockerell.)

Calcicole: marly pond south of Bic Mt. (Bic).

Boreal American (very local): n. B.C., Mack. (Great Slave L.), central Sask., n. Ont., and e. Que., southw. to the Queen Charlotte Islands, n. Wash., Idaho, n. shore of Lake Superior, n. Mich., and n. Me.; with the species, boreal circumpolar; Europe: Finland and Russian Karelia and Petchora R.; Asia: northwestern Siberia to Kamtchatka, south to Lake Baikal, Sakhalin, China, Japan, and Kahsia Mts. of India; Australia: N. Queensland (?).

3. NUPHAR J. E. Smith

(Pond Lily)

a. Flowers less than 2 cm. broad; stigma 7-10-rayed, dark red; fruit globular with a short beak; leaves 4-10 cm. long.................................1. *N. microphyllum*

a. Flowers more than 2 cm. broad; stigmas generally more than 10-rayed; fruit decidedly contracted above; leaves generally more than 10 cm. long.
  b. Flowers about 4·5 cm. broad (10 cm. when opened); stigmas yellow; leaves 17-28 cm. long...2. *N. variegatum*
  b. Flowers 2·5-3·5 cm. broad; stigma dark red; leaves 7-20 cm. long...3. *N. rubrodiscum*

1. **N. microphyllum** (Pers.) Fernald. [HH] (*Nymphaea microphylla* Pers.; *Nymphozanthus microphyllus* (Pers.) Fernald.)

Ponds (Bic; Mét.; Lac au Saumon; Amqui; St. Léandre); alpine pond (Tbl.).

Temperate eastern American: Minn. to e. Que., southw. to Ohio, Pa., and N.J.

2. **N. variegatum** Engelm. [HH] (*Nymphaea variegata* Mill.; *Nymphozanthus variegatus* (Engelm.) Fernald.)

Ponds (Bic; Lac du Club; Tng.; Gnd.; New Carlisle; Nou.; Res.; Zén.); alpine pond (Tbl.).

Boreal American: Alaska, Yukon, Mack. (Great Slave L.), to s. James Bay, Côte Nord, and Nfld., southw. to Mont., Ohio, Pa., and N.J.

3. **N. rubrodiscum** Morong. [HH] (*Nymphaea rubrodisca* (Morong) Greene; *Nymphozanthus rubrodiscus* (Morong) Fernald.)

Ponds (Bic; Tng.; Cha.; New Carlisle); alpine ponds (Alb.; Tbl.).

Temperate eastern American: Minn. to e. Que., southw. to Pa. and N.J.

39. RANUNCULACEAE

(Crowfoot Family)

a. Leaves opposite, trifoliolate, the leaflets ovate, acute; stems climbing; styles persistent, plumose, elongated...1. *Clematis*

a. Leaves alternate; stems not climbing.
  b. Flowers yellow (or if white, plants aquatic).
    c. Petals none; sepals bright yellow, broadly oval; fruit a follicle; leaves round or reniform, crenate; stem hollow, furrowed.............................2. *Caltha*
    c. Petals 5, with a scale or gland at base; fruit an achene, the achenes numerous, capitate; carpels 1-ovuled.......................................3. *Ranunculus*
  b. Flowers not yellow.
    c. Flowers irregular, blue, in erect spike-like terminal racemes, the posterior sepal hooded, helmet-like, covering the two long-clawed small petals......4. *Aconitum*
    c. Flowers regular.
      d. Carpels several-ovuled; fruit a follicle or berry.
        e. Petals not spurred, white; sepals deciduous.
          f. Low herbs with solitary flowers on slender scapes; leaves evergreen, shining, 3-foliolate, the leaflets obovate-wedge-form, sharply toothed; fruit a follicle; rootstocks of long, bright yellow, bitter fibres..........5. *Coptis*
          f. Tall erect herbs with terminal racemose flowers; leaves 2-3-ternately compound, the ovate leaflets sharply cleft and toothed; fruit a berry, red or white..6. *Actaea*
        e. Petals prolonged backwards into long hollow spurs; pistils 5, with slender styles; follicles erect; leaves 2-3-ternately compound............7. *Aquilegia*
      d. Carpels 1-ovuled; fruit an achene.
        e. Flowers subtended by involucres; sepals petaloid.
          f. Involucre remote from the flower, leaf-like; leaves compound or dissected; pistils very many..8. *Anemone*
          f. Involucre close to the flower, of 3 oval bracts, calyx-like; leaves radical, simple, heart-shaped and 3-lobed, thickish and persistent throughout the winter; flowers single on hairy scapes; pistils several..........9. *Hepatica*
        e. Flowers panicled, not subtended by involucres; petals none; leaves 2-3-ternately compound, the petioles dilated at base..............10. *Thalictrum*

1. CLEMATIS L.

(Virgin's Bower)

a. Flowers cymose-paniculate, 2 cm. in diameter, white, dioecious......1. *C. virginiana*

a. Flowers solitary or few, 5-7·5 cm. in diameter, purple, perfect; outer stamens enlarged, petaloid..2. *C. verticillaris*

1. **C. virginiana** L. [N (vine)]

Woods (Rim.; Cap Chat; Ann. (northeastern limit); Bon.; PCa.; Nou.; Mat.; Routhierville); rich woods at foot of mountain (Nic.).

Temperate American: Man. to e. Que., southw. to La. and Ga.

2. **C. verticillaris** DC. [N(vine)] (*Atragene americana* Sims.)

Wooded inland cliffs (Tra.); river gravels (Pab.; Bon.); river banks (Cap Chat; Gnd.).

Boreal American: Man., Hudson Bay, e. Que., southw. to Minn. and N.C.

2. CALTHA (Rupp.) L.

(Marsh Marigold)

1. **C. palustris** L. [Hs]

Swampy soil (Bic; Rim.; Cap Chat; Lac du Club; Mad.); river gravels (Ann.; Jhn.; Portage; Gnd.; Pab.); subalpine swamp (Tbl.).

Arctic circumpolar: n. coast of Alaska, Herschel I., Cape Bathurst, and Coronation Gulf (all forma *radicans* (Forst.) Hartm.) to Lab. and Nfld., southw. to Nebr. and S.C.; Iceland; Faeroes; arctic and alpine Eurasia.

3. RANUNCULUS (Tourn.) L.

(Buttercup. Crowfoot)

[Drew: The North American representatives of Ranunculus, section Batrachium; Rhodora 38: 1-47. 1936. Benson: North American Ranunculi; Bull. Torrey Bot. Club 68: 157-172, 477-490, 640-659. 1941; 69: 298-316, 373-386. 1942. Benson: The North American subdivisions of Ranunculus; Amer. Journ. Bot. 27: 799-807. 1940. Polunin: Supplementary notes on arctic and boreal species in Benson's "North American Ranunculi"; Bull. Torrey Bot. Club 71: 246-253. 1944. Benson: A reply to Dr. Polunin; Bull. Torrey Bot. Club 71: 254-257. 1941. Benson: A treatise on the North American Ranunculi; Amer. Midland Nat. 40: 1-261. 1948.]

a. Sepals 3; achenes constricted at the middle, somewhat fusiform, with a slender hooked beak; petals oblong, yellow with orange veins; scape 6-10 cm. high, 1-leaved near the base, the leaf reniform, deeply 3-parted, the segments obovate, cuspidately several-toothed; rootstocks filiform; rare bog plant.........................1. *R. lapponicus*

a. Sepals 5 or rarely 6; achenes not constricted.

  b. Petals white, not glossy; achenes roughly transversely ridged; receptacle densely hairy; aquatic plants.

    c. Stems 1-2·5 mm. thick; stamens usually 10 or more..2. *R. aquatilis*, var. *capillaceus*

    c. Stems 0·4-1 mm. thick; stamens 5-8.............2a. *R. aquatilis*, var. *eradicatus*

  b. Petals yellow, usually glossy; achenes not transversely ridged, except in *R. sceleratus*, which has 40 or commonly 100-300 minute beakless achenes in an elongated head.

c. Pericarp striate, the nerves 3 or more on each face, these sometimes branched; wall of ovary thin and usually fragile at fruiting time.
  d. Scape usually branched; basal leaves 5-22 mm. long, 4-20 mm. broad, crenate; sepals 3-5 mm. long; stamens usually 15-25; achenes 40-50 in a head 3-8(-13) mm. long.............3. *R. Cymbalaria*
  d. Scape usually unbranched; basal leaves 4-10 mm. long, 2·5-8 mm. broad, 3-toothed at the apices and normally not crenate; sepals 2-3 mm. long; stamens about 10; achenes 25-60 in a head 3-5 mm. long...3a. *R. Cymbalaria*, var. *alpina*
c. Pericarp not striate or nerved; wall of ovary thick and firm.
  d. Basal leaves filiform or linear, entire; flowers small; stems filiform and creeping, rooting at all the nodes; plants of gravelly or sandy shores.............4. *R. Flammula*, var. *filiformis*
  d. Basal leaves broader, lobed, parted or divided.
    e. Styles and achene beaks practically lacking, the stigmas nearly sessile; flowers 6-8 mm. broad, the petals scarcely exceeding the sepals; stems stout, hollow.............5. *R. sceleratus*
    e. Styles and achene beaks well developed, the beaks at least half as long as the achene body.
      f. Aquatic or creeping mud plants.............GROUP A.
      f. Terrestrial plants with well-developed stems.............GROUP B.

GROUP A

a. Achenes each with corky thickening beside the inconspicuous keel; leaves pentagonal, palmately 1-2-parted or -lobed, 1-2 cm. long, 1·5-2·5 cm. broad; anthers elliptic, 0·5-1 mm. long; petals 4-7 mm. long.............6. *R. Gmelinii*, var. *Hookeri*
a. Achenes each with a conspicuous corky keel; leaves finely dissected into ribbon-like segments 1-2 mm. broad, the blades 1·5-10 cm. long, 2-12 cm. broad; anthers oblong, 1-1·5 mm. long; petals 7-15 mm. long.............7. *R. flabellaris*

GROUP B

a. Nectary-scale attached to the petal laterally and forming a pocket; dorsoventral measurement of the achene 1-2·5 times the lateral; sepals always tinged with purple or lavender on the back.
  b. Stems not more than 5 cm. long at fruiting time.
    c. Radical leaf-blades simple, semicircular, 3-parted or -divided, the middle lobe entire, the lateral 2-3-lobed; fruiting head ovoid or subglobose, 2·5-4 mm. long, 2·5-3 mm. thick.............8. *R. pygmaeus*
    c. Radical leaf-blades divided, the divisions sometimes short-petiolulate, the middle division again 3-lobed, the lateral divisions 2- or 4-lobed or -cleft; fruiting heads cylindrical, 5-7·5 mm. long, 3-4·5 mm. thick......8a. *R. pygmaeus*, var. *Langeana*
  b. Stems 5 cm. or more long at fruiting time.
    c. Fruiting receptacle 2-4 mm. long, 1-3 mm. thick; petals pale yellow, shorter than the reflexed calyx.............9. *R. abortivus*
    c. Fruiting receptacle 4-16 mm. long, usually 3-9 mm. thick.
      d. Sepals and usually the pedicels densely tomentose; radical leaves pedately many-cleft.............10. *R. pedatifidus*
      d. Sepals and pedicels glabrous or thinly pilose; radical leaf-blades reniform or semicircular; stems 1-3-flowered.............11. *R. Allenii*
a. Nectary-scale free laterally for at least two-thirds its length, not forming a pocket (except in *R. recurvatus*); dorsoventral measurement of the achene 3-15 times the lateral; sepals usually not lavender- or purple-tinged.
  b. Achene beak 2-4 mm. long, straight, often deciduous, stout, sword-shaped; flowers bright yellow, 10-35 mm. broad, the petals twice the length of the spreading sepals.............12. *R. septentrionalis*
  b. Achene beaks not over 2 mm. long, regularly curved or hooked.
    c. Fruiting receptacle at least 3 times the length in anthesis, hispid; head of achenes ovoid or cylindrical.
      d. Sepals equalling or a little shorter than the petals, these 3-7 mm. long; head of achenes ovoid, 7-9 mm. long; stems often rooting at the nodes.............13. *R. Macounii*

d. Sepals about twice the length of the petals, these 2-3 mm. long; head of achenes cylindrical, 11-17 mm. long; stem never rooting adventitiously...... ....14. *R. pensylvanicus*

c. Fruiting receptacle not more than 2·5 times the length in anthesis; head of achenes hemispherical or globose.

d. Petals minute, pale yellow, about the length of the reflexed sepals; achenes finely reticulate; stem base bulbous; plant hirsute..........15. *R. recurvatus*

d. Petals large and conspicuous, 6-18 mm. long, at least twice as long as the sepals.

e. Stems rooting at the nodes.

f. Trailing or repent branches or stolons present.

g. Stems and petioles distinctly pubescent..................16. *R. repens*

g. Stems and petioles glabrous or nearly so..16a. *R. repens,* var. *glabratus*

f. Trailing or repent branches wanting..........16b. *R. repens,* var. *erectus*

e. Stems never rooting adventitiously; leaves 3-divided, the divisions all sessile; erect plants with fibrous roots; naturalized in fields....17. *R. acris*

1. **R. lapponicus** L. [Hrr]

Calcicole: depressions in cedar swamp (Bic).

Arctic circumpolar: n. coast of Alaska, Yukon, Mack. (Mack. R. Delta, Great Bear L., Coronation Gulf), Hudson Bay (Chesterfield Inlet, Hudson Str.), s. and e. Baffin, n. Lab., southw. to B.C., Alb., Sask., Man., n. Minn., s. James Bay, and Me.; w. Greenland; Spitsbergen; arctic Eurasia.

2. **R. aquatilis** L., var. **capillaceus** (Thuill.) DC. [HH] (*R. trichophyllus* Chaix; including *R. circinatus* Sibth, var. *subrigidus* (Drew) Benson, Amer. Midland Nat. 40: 240-243. 1948.)

Submerged river gravels and alluvia (Drt.; Yrk.; PCa.; Mat.).

Halophyte: brackish waters of river estuaries (Mad.; Yrk.).

Arctic circumpolar: Aleutian Is., Alaska, Yukon, Mack. (Mack. R. Delta, Great Bear L.), n. Baffin, Lab., and Nfld., southw. to Calif., N. Mex., S. Dak., Minn., and Pa.; Iceland; Eurasia.

2a. **R. aquatilis,** var. **eradicatus** Laestad. (*R. trichophyllus,* var. *eradicatus* (Laest.) Drew.)

River estuary (Yrk.); inland lake (Lac Pleureuse); subalpine lake (Tbl.).

Arctic circumpolar: Alaska, Yukon, Mack. (Mack. R. Delta, Great Bear L.), n. Baffin, Keewatin, n. Lab., and Nfld., southw. to Gaspe, and in the mts. to N. Eng.; n., w., and e. Greenland; Iceland; arctic Eurasia.

3. **R. Cymbalaria** Pursh. [Hsr]

Halophyte: salt marshes and tidal flats (Bic; Rim.; Mét.; Cld.; Manche d'Epée; Val.; Drt.; Bon.; Car.; New Richmond). General in its habitat.

(Arctic-)boreal American (chiefly maritime): Alaska, Yukon, Mack., Coronation Gulf, Hudson Bay (Churchill), Lab., and Nfld., southw. to n. Wash., Idaho, Utah, N. Mex., Tex., Ark., n. Ill., and N.J.; w. Greenland; Asia (Himalaya Mts. and Siberia); one of the maritime elements in the flora of the Great Lakes.

Forma *hebecaulis* Fernald, with petioles and peduncles more or less pilose (Rhod. 16: 162. 1914), has been collected from moist hollows in the gravelly beach of the spit at Carleton, the type station.

3a. **R. Cymbalaria,** var. **alpina** Hook.

Halophyte: salt marshes (Bic; Bon.).

Disjunct American (maritime): Alaska, Coronation Gulf; James Bay, e. Que., and Nfld.; w. Greenland; e. Asia.

4. **R. Flammula** L., var. **filiformis** (Michx.) Hook. [Hsr] (*R. reptans* L.) Creeping Spearwort

Wet shores (Cap Chat; Marsouins; Gnd.; Cha.; Mat.); edge of subalpine lakes (Tbl.; Log.).

(Arctic-)boreal circumpolar: Alaska, Yukon, Mack., n. Hudson Bay, n. Lab., and Nfld., southw. to Wash., Wyo., Minn., Pa., and N.J.; Greenland; Iceland; n. Eurasia.

5. **R. sceleratus** L. [T] Cursed Crowfoot

Conifer woods (Bic; Mét.; Gpe.; Pcé.).

(Boreal-)temperate circumpolar: Wash. to Lab. and Nfld., southw. to Oreg., La., and Ga.; Eurasia.

6. **R. Gmelinii** DC., var. **Hookeri** (D. Don) Benson. [HH] (*R. Purshii* Richards.; *R. Gmelinii,* var. *terrestris* Benson.)

Calcicole: pools in cedar swamps (Bic; Rim.; Mtn.; Bon.).

Arctic American: n. coast of Alaska, Yukon, Mack. (Mack. R. Delta, Cape Bathurst, Great Bear L., Coronation Gulf), w. and e. coast of Hudson Bay, s. Lab., and Nfld., southw. to Oreg., Nev., Colo., N. Dak., Minn., Mich., and Me.; e. Asia.

7. **R. flabellaris** Raf. [HH] (*R. delphinifolius* Torr.; *See* Fernald, Rhod. 38: 171-173. 1936.) Yellow Water Crowfoot

Swampy soil (Rim.).

Temperate American: B.C. to e. Que., southw. to Calif., Nev., Utah, La., Va., Pa., and N.J.

8. **R. pygmaeus** Wahl. [Hs]

Damp mossy hollows in shade of alpine amphibolite rocks (Alb.); alpine rocks (Tbl.).

Arctic circumpolar, alpine: Alaska, Yukon, Mack., Victoria I., Keewatin, Ellesmere, Devon, Baffin, Melville, n. Lab., southw. in the mts. to B.C., Wyo., and Gaspe; w. and e. Greenland; Iceland; Spitsbergen; arctic Eurasia.

8a. **R. pygmaeus,** var. **Langeana** Nathorst. (*R. pygmaeus,* var. *petiolulatus* Fernald, Rhod. 19: 137. 1917; *See* M. P. Porsild, Meddel. om Groenl. 77: 42. 1931.)

Damp mossy hollows in shade of alpine rocks (Alb.).

Mts. of Mont. and Gaspe Peninsula; w. and e. Greenland.

9. **R. abortivus** L. [Hs] (Including var. *eucyclus* Fern., Rhod. 1: 52. 1899, and var. *acrolasius* Fern., Rhod. 40: 418. 1938; *See* Fassett, Amer. Midland Nat. 27: 512-522. 1942, and Benson, Amer. Midland Nat. 40: 162-164. 1948.)

Woods (Bic; Rim.; Mét.; Prr.; For.; Gpe.; Dou.; Gnd.; PCa.; GCa.; Drt.; Res.); gravel bank (Car.); subalpine woods (Alb.; Tbl.; Log.; Mtt.; Ftn.; Lyl.; Col.).

Boreal American: s. Alaska, Yukon, and B.C. to James Bay, s. Lab., and Nfld., southw. to Wyo., S. Dak., n. Mich., N.Y., and Conn., and in the mts. to Colo.; more northern than the typical glabrous form.

10. **R. pedatifidus** Sm. [Hs] (*R. affinis* R. Br.; *R. affinis*, var. *leiocarpa* Trautv.; *See* Fernald, Rhod. 19: 138. 1917; 36: 93-96. 1934.)

Alpine schists (Alb.; Tbl.; Bln.).

Arctic circumpolar, alpine: n. Alaska, Yukon, Mack., Herschel I., Banks I., Melville I., Victoria I., Keewatin, Ellesmere, Baffin, n. Lab., and Nfld., southw. to Alb. and Sask., and in the mts. to Colo. and Gaspe; w. and e. Greenland; Spitsbergen; n. Eurasia.

11. **R. Allenii** Robinson, Rhod. 7: 220. 1905. [Hs] (*See* Fernald, Rhod. 40: 416-420. 1938.)

Flood-plain of alpine brook (Alb.) (type station); damp alpine slopes (Tbl.).

Arctic eastern American, alpine: Hudson Bay (Port Harrison), Ungava Bay (Akpatok Island), s. Baffin, n. Lab., southw. in the mts. of Gaspe.

12. **R. septentrionalis** Poir. [Hsr] Swamp Buttercup

Swampy soil in woods (Bic; Rim.; Mtn.; Mad.; Gnd.; GCa.; Nou.).

Boreal American: s. Alaska and B.C. to James Bay and s. Lab., southw. to Tex., Ark., Ky., and Ga.

13. **R. Macounii** Britton. [Hs]

Wet meadows and alluvial thickets (Cap Chat; Ann.; Marsouins; Cld.; Lou.; Mad.; Drt.; Bon.).

Boreal American: Alaska, Yukon, Mack. (Great Slave L.), Hudson Bay, s. Lab., and Nfld., southw. to Calif., Ariz., N. Mex., Iowa, Mich. (Isle Royale), Ont., and Que.; e. Asia.

14. **R. pensylvanicus** L. f. [T] Bristly Buttercup

Swampy soil (Bic; Rim.; Mtn.; Gpe.); wet clay (Car.); cedar swamp (Bon.).

Boreal American: Alaska, Mack., James Bay, s. Lab., and Nfld., southw. to Ariz., N. Mex., and Ga.; China and Burma.

15. **R. recurvatus** Poir. [Hs] Hooked Buttercup

Woods (Cld.; Drt.; GCa.; Nou.; St. Tharsicius).

(Boreal-)temperate eastern American: e. Man. to Nfld., southw. to Tex., Mo., Ala., and Fla.

16. R. REPENS L. [Hsr] Creeping Buttercup

Alluvium below calcareous cliffs (Pcé.); river gravels (Mtn.; Yrk.; Gnd.); river banks and mud flats (Mad.; Cannes des Roches; GCa.; Mat.); ditches (Mét.; Car.; Mar.).

Eurasian: naturalized throughout N.A. from Alaska to Nfld., southw. to Colo. and N.C.; Greenland; Iceland; Faeroes.

16a. R. REPENS, var. GLABRATUS DC. (*See* Fernald, Rhod. 21: 169. 1919.)

Shaded river bank (Mat.); wet places (Mét.; Cap Chat; Car.).

Eurasian: naturalized in N.A. from Alaska to Lab. and Nfld., southw. to Nev., Utah, Colo., Ont., and N.J.

16b. R. REPENS, var. ERECTUS DC. (*See* Fernald, Rhod. 21: 169. 1919.)

Swampy soil in woods (GCa.; Mat.).

European: naturalized in N.A. from Wash. to Calif., and in Que. and Nfld. According to Benson (Amer. Midland Nat. 40: 33. 1948), this variety is essentially synonymous with the preceding.

17. R. ACRIS L. [Hs] Field Buttercup

Dry fields (Bic; Mét.; Mad.; GCa.; Car.). General in its habitat.

Eurasian: naturalized in N.A. from Alaska to Lab. and Nfld., southw. to Oreg. and N.C.; Greenland; Iceland.

4. ACONITUM (Tourn.) L.
(Monkshood. Aconite)

1. A. NAPELLUS L. [Grt] Bailey, Man. of Cult. Plants, p. 285. 1924.

Roadside near gardens (Bic; Pte. au Père; Ste. Luce; Amqui).

European: escaped from cultivation in temperate N.A.

5. COPTIS Salisb.
(Goldthread)

1. **C. trifolia** (L.) Salisb., var. **groenlandica** (*Oeder*) Fassett. [Hrr] (*See* Fassett, Trans. Wisc. Acad. Sci. 38: 195. 1947.)

Mossy woods (Bic; Mét.; Cap Chat; Gpe.; Gnd.; PCa.; Zén.; Irn.); mossy subalpine woods (Alb.; Tbl.; Bln.). General in its habitat.

Arctic American: s. Alaska, Lesser Slave L., Man., se. Baffin, n. Lab., and Nfld., southw. to Iowa and N.J., and in the mts. to Tenn. and N.C.; s. Greenland; replaced in the Aleutian Is., Alaska, and B.C. by the typical form.

6. ACTAEA L.
(Baneberry)

a. Pedicels stout, in flower 3-6 mm. long, red; berries white, globular-ovoid; leaves glabrous beneath except for a few hairs on the veins......................1. *A. alba*

a. Pedicels slender, in flower 8-15 mm. long; berries red, ovoid-ellipsoid; leaves usually with scattered hairs over the entire lower surface..................2. *A rubra*

1. **A. alba** (L.) Mill. [Grh] (*A. pachypoda* Ell.; *See* Fernald, Rhod. 42: 260-264. 1940; Gleason, Rhod. 46: 146-148. 1944.) White Baneberry

Woods and thickets (Bic; Rim.; Prr.; Anse au Gascon; R. Ouest). General in its habitat.

Temperate eastern American: Minn. to e. Que., southw. to Mo. and Ga.

2. **A. rubra** (Ait.) Willd. [Grh] Red Baneberry

Woods (Bic; Rim.; Mét.; Ann.; Val.; Gpe.; Pcé.; Gnd.; R. Ouest; God.; Car.; Mat.; Irn.); subalpine woods (Tbl.; Bln.); subalpine meadow (Log.; Mtt.). General in its habitat.

Boreal American: Alaska, Yukon, Mack. (Great Slave L.), James Bay, s. Lab., and Nfld., southw. to Oreg., Utah, Colo., Nebr., Mich., and N.J.

Forma *neglecta* (Gillman) Robinson, with white berries, has been collected in woods (Bic; Rim.; Mét.; Prr.; Val.; Anse au Gascon; R. Ouest; Car.; Mat.; Irn.; Bln.).

7. AQUILEGIA (Tourn.) L.
(Columbine)

a. Spurs straight; flowers scarlet, yellow inside; native plants..........1. *A. canadensis*

a. Spurs strongly hooked and shorter; flowers blue, purple, pink, or white; garden escape..........2. *A. vulgaris*

1. **A. canadensis** L. [Hs] Wild Columbine

Calcicole: sea cliffs and ledges (Bic).

Temperate American: Alb. to e. Que., southw. to Tex. and Fla.; also in the Rocky Mts.

2. A. VULGARIS L. [Hs] Garden Columbine

Roadside (Bic; Rim.; Mét.; Mtn.; Gpe.; Bnc.; Car.; Nou.).

European: escaped from cultivation in temperate N.A.

8. ANEMONE (Tourn.) L.
(Anemone)

a. Achenes glabrous or merely pubescent; head of fruit globose.
  b. Leaves of the involucre sessile; flowers several; sepals white; achenes glabrous, orbicular, compressed, wing-margined..........1. *A. canadensis*
  b. Leaves of the involucre long-petioled; flower solitary; sepals white or tinged with purple outside; achenes pubescent, oblong, with a hooked beak..........2. *A. quinquefolia*

a. Achenes densely woolly.
  b. Stem simple, slender, 1-flowered; basal leaves long-petioled, 3-parted, the broadly wedge-shaped divisions obtusely lobed or crenate; sepals oval, white with bluish bases; head of fruit globular..........3. *A. parviflora*
  b. Stems commonly branching above, generally 2-several-flowered.
    c. Leaves 3-5-parted, the divisions cleft into narrowly linear acute lobes, those of the involucre short-petioled; head of fruit globose or oval.
      d. Sepals 5-10 mm. long, yellowish white within, yellowish, greenish, or dull purplish outside; flowering stems 0·5-3 dm. high, 1-3-flowered..........4. *A. multifida*, var. *hudsoniana*
      d. Sepals 1·1-1·7 cm. long, bright red; flowering stems (1·5-)3-7 dm. high, 1-5-flowered..........4a. *A. multifida*, var. *Richardsiana*
    c. Leaves 3-parted, the divisions lanceolate to ovate-lanceolate, cleft into acute serrate lobes, those of the involucre slender-petioled; head of fruit subcylindric..........5. *A. riparia*

1. **A. canadensis** L. [Hs] Meadow Anemone

River gravels (Mtn.; Val.; Drt.; PCa.; Bon.; Mat.); swampy ground (Bic; Rim.; Mét.; R. Blanche; Srl.; Plr.; Gnd.; New Richmond; Res.); sea beach (Bic; Trl.).

Boreal American: Mack. (Great Slave L.) and Alb. to James Bay and s. Lab., southw. to Colo., Kans., Mo., and Md.

2. **A. quinquefolia** L. [Grh] Wood Anemone

Habitat not stated (Bic; Gnd.) (*See* Fernald, Rhod. 30: footnote, p. 186. 1928).

Temperate American: Rocky Mts., Great Lakes region (var. *interior* Fernald), e. Que., southw. to Iowa, Tenn., and Ga.; closely related to the European *A. nemorosa* L.

3. **A. parviflora** Michx. [Hsr]

Calcicole: sea cliffs (Bic; Srl.; Lbn.; Pcé.; Bon. I.; Pas.); river ledges and gravels (Ann.; Lou.; Mad.; Drt.; Yrk.; Gnd.; Pab.; Bon.; GCa.); calcareous alpine cliffs (Tbl.); wet alpine rocks (Alb.; Log.; Mtt.; Col.).

Arctic American, alpine: Aleutian Is., n. coast of Alaska, Yukon, Herschel I., Mack. (Mack. R. Delta, Great Bear L.), Victoria I., n. Hudson Bay, Lake Mistassini, n. Lab., and Nfld., southw. to Oreg., the Great Lakes region, Ont., and N.B.; e. Asia.

4. **A. multifida** Poir., var. **hudsoniana** DC. [Hs] (*A. hudsoniana* Richards.; *See* Fernald, Rhod. 19: 141. 1917.)

Calcicole: sea cliffs (Bic; Prr.; Lbn.; For.); river ledges and gravels (Rim.; Drt.; Jhn.; Gnd.; Bon.; PCa.; GCa.; Res.).

Boreal American: Alaska, Yukon, Mack. (Great Bear L.), Hudson Bay (Churchill), Anticosti, and Nfld., southw. to Utah, N. Mex., Nebr., Mich., and N.Y.

Var. *hudsoniana,* forma *sanguinea* (Pursh) Fernald, with 5 bright red sepals (Rhod. 19: 141. 1917), has been collected from river ledges (Drt.; Gnd.; Bon.; Mat.).

Var. *hudsoniana* forma *polysepala* Fernald, with 14-16 sepals, has been collected at the type station, river gravels (Gnd.).

4a. **A. multifida,** var. **Richardsiana** Fernald, Rhod. 19: 141. 1917.

Calcicole: river gravels (Gnd. (type station); Bon.; Res.).

Gaspe endemic.

Var. *Richardsiana,* forma *leucantha* Fernald, with milk-white sepals, has been collected from river gravels of the type station (Gnd.) and sea cliffs (Prr.).

A hybrid, *A. multifida,* var. *hudsoniana* × *riparia,* is described by Rousseau (Nat. Mus., Canada, Bull. 66: 13. 1931) from slaty banks of Restigouche River: "Diffère de l'*A. multifida,* var. *hudsoniana* par ses feuilles moins incisées et par les segments plus larges; styles recourbés en dehors, comme dans l' *A. riparia*".

5. **A. riparia** Fernald. [Hs]

Calcicole: sea cliffs and ledges (Bic; Val.; Lbn.; Pcé.; New Richmond); river ledges and gravels (Rim.; Cap Chat; Mad.; Drt.; Jhn.; Gnd.; Pab.; Bon.; PCa.; Nou.; Mat.; Res.); dry woods (Mad.).

Boreal American: B.C. to s. James Bay and e. Que., southw. to Pa.

Forma *inconspicua* Fernald, with sepals thick and leathery, greenish or greenish white, oblong-acuminate, 0·7-1·3 cm. long, has been collected from the sea cliffs of Mont. St. Pierre, the type station, from Mont Ste. Anne, Percé, and from dry slaty banks of Cap Chat River.

Forma *rhodantha* Fernald, with bright red sepals, has been collected from river gravels of the type station, Grande Rivière.

9. HEPATICA (Rupp.) Mill.

(Hepatica. Liverleaf)

1. **H. americana** (DC.) Ker. [Hr] (*H. triloba* of Gray's Man., ed. 7; *See* Fernald, Rhod. 19: 45-46. 1917.)

Rocky woods (Rim.) (northeastern limit).

Temperate American: Man. to e. Que., southw. to Mo. and Fla.

10. THALICTRUM (Tourn.) L.
(Meadow Rue)

[Boivin: American Thalictra and their Old World Allies; Rhod. **46**: 337-377, 391-445, 453-487. 1944.]

a. Flowers perfect; sepals 5, exceeding the stigma; filaments slender; panicle very simple, often racemose; leaves small, tufted at the summits of scaly rootstocks, pinnate, with the lower primary divisions ternate; leaflets cuneate-obovate or orbicular, firm; stems simple, scape-like, 2-20 cm. high................1. *T. alpinum*

a. Flowers dioecious or polygamous; style exceeding the 4 sepals towards anthesis; sepals of the pistillate flowers smaller and narrower than those of the staminate ones; stems leafy.

  b. Filaments coloured, filiform; flowers dioecious, greenish or purplish; terminal leaflet 3-lobed, the lobes crenate; achenes sessile, regularly ribbed......2. *T. confine*

  b. Filaments white, clavate; flowers polygamo-dioecious, whitish; terminal leaflet 3-lobed, the lobes entire; achenes subsessile, the ribs often connected by transverse reticulations...3. *T. polygamum*

1. **T. alpinum** L. [Hs] (*T. alpinum*, var. *gaspense* Greene, Ott. Nat. **23**: 18. 1909.)

Calcicole: sea cliffs (Pcé.; Bon. I.); river ledges (Yrk.; Gnd.; Pab.); talus of alpine mica schist (Log.).

Arctic circumpolar, alpine: Alaska, Yukon, Mack., then isolated in the mts. from Idaho, s. Wyo., and Utah to w. Calif. and Colo.; Hudson Str. and n. Lab. to Gaspe Peninsula and Nfld.; w. and e. Greenland; Iceland; Faeroes; arctic and alpine Eurasia.

2. **T. confine** Fernald. [Hs]

Sea cliffs and ridges (Bic; Plr.; Lou.); brookside (Ste. Félicité); river gravels (Res.); gravelly beaches (Mét.; R. Blanche; Trl.; Ren.; Car.); alluvial thickets (Srl.).

Boreal American: Man., James Bay, Lab., southw. to Minn. and N.Y.

3. **T. polygamum** Muhl. [Hs]

Sea cliffs (Val.; Pcé.); wet places (Rim.); gravelly river banks (Mat.); brackish meadows (Bic); alluvial thickets (Gnd.).

Boreal eastern American: Ont. to s. Lab. and Nfld., southw. to Ohio and Fla.

40. BERBERIDACEAE
(Barberry Family)

1. CAULOPHYLLUM Michx.
(Blue Cohosh)

1. **C. thalictroides** (L.) Michx. [Grh]

Wooded island at river mouth (Mat.) (northeastern limit).

Temperate American: Man. to e. Que., southw. to Mo. and S.C.

41. PAPAVERACEAE
(Poppy Family)

a. Pod globular, dehiscent at the top by many pores under the many-rayed discoid stigma; flowers bluish white with a purple centre; stem leafy, the leaves pinnatifid, glaucous, clasping by a cordate base; juice milky......................1. *Papaver*

a. Pod fusiform, dehiscent to the base; stigma not discoid; flowers white, solitary; plant scapose, with a single cordate to reniform, palmately lobed basal leaf; juice red..........2. *Sanguinaria*

1. PAPAVER (Tourn.) L.

(Poppy)

1. P. SOMNIFERUM L. [T] Opium Poppy

Path near cabin below Mt. Albert (Ann.); sandy river flats near an old stable (St. Tharsicius); habitat not stated (Cape Cove).

European: adventive in temperate N.A.

2. SANGUINARIA (Dill.) L.

(Bloodroot)

1. **S. canadensis** L. [Grh]

Rich damp ground (Beauséjour; Rim.); woods at river mouth (Mat.) (northeastern limit).

Temperate American: Man. to e. Que., southw. to Nebr., Ark., Ala., and Fla.

42. FUMARIACEAE

(Fumitory Family)

a. Corolla white, tipped with cream-colour, with two opposite petals spurred; pod several-seeded, the seeds crested; plant erect, scapose, from a fleshy, loosely scaly bulb..........1. *Dicentra*

a. Corolla not white, with but one petal spurred or saccate at base.

- b. Pods oblong, several-seeded, the seeds crested; flowers 10-15 mm. long..........2. *Corydalis*
- b. Pods globular, 1-seeded, the seed crestless; flowers deep purple, tipped with crimson, 5-7 mm. long..........3. *Fumaria*

1. DICENTRA Bernh.

(Dutchman's Breeches)

1. **D. Cucullaria** (L.) Bernh. [Gb]

Woods (Rim.; Ste. Angèle; St. René; Méchins; Cap Chat; Srl.; Prr. (northeastern limit); Res.); alluvium of subalpine brook (Mtt.); thickets below mountain (Col.).

Temperate American: Wash. and Oreg. to e. Que., southw. to Mo. and Ga.

2. CORYDALIS (Dill.) Medic.

(Corydalis)

a. Flowers purplish green or rose-colour, tipped with yellow; spur very short and rounded; pods erect; stem usually strict..........1. *C. sempervirens*

a. Flowers golden-yellow, the spur about half as long as the corolla; pods spreading or pendulous, becoming torulose; stem diffuse, low; leaves more finely divided with more acute segments..........2. *C. aurea*

1. **C. sempervirens** (L.) Pers. [Hs]

Slaty fields (Bic; Ann.; Prr.; Car.); dry roadside gravels (Yrk.).

Boreal American: Alaska, Yukon, Mack. (Great Bear L., Great Slave L.), n. Man., James Bay, Lab., and Nfld., southw. to Mont., Minn., Ky., and Ga.

2. **C. aurea** Willd. [Hs] Golden Corydalis

Calcicole: sea cliffs and slaty fields (Bic); river ledges (Mat.).

Boreal American: Alaska, Yukon, Mack. (Great Bear L.), to e. Que., southw. to Calif., Ariz., Tex., Mo., Wis., Pa., and Vt.

3. FUMARIA (Tourn.) L.
(Fumitory)

1. F. OFFICINALIS L. [T] Common Fumitory

Near a garden (Bic); field (Lou.); potato field (Mtn.).

European: escaped from cultivation in temperate N.A.

43. CRUCIFERAE
(Mustard Family)

a. Pod indehiscent, short or elongated.
  b. Pod globose, reticulated, 2-3 mm. in diameter, 1-seeded; pedicels filiform; flowers yellow, nearly 2 mm. broad; leaves oblong, entire, sagittate-clasping; plant somewhat stellate-pubescent..........1. *Neslia*
  b. Pod elongated.
    c. Pod not jointed, 2-8-seeded, constricted between the seeds, beaked; petals dark-veined..........2. *Raphanus*
    c. Pod transversely 2-jointed, the upper joint larger, with 1 erect seed, the lower joint sterile or with 1 suspended seed.
      d. Flowers pale yellow; pedicels appressed; upper leaves sessile, lanceolate, toothed; lower leaves petioled and lyrate; plant pubescent.......3. *Rapistrum*
      d. Flowers light purple; leaves oblanceolate or obovate, obtuse, sinuate-dentate or lobed; plant glabrous, fleshy, bushy-branched, maritime..........4. *Cakile*

a. Pod a silique, dehiscent into 2 valves at the base.
  b. Petals yellow.
    c. Pod short, not more than 3 times as long as broad.
      d. Pubescence stellate.
        e. Pod thick, obovoid or pear-shaped, 4-6 mm. long; leaves lanceolate, sessile, auricled or the lower narrowed at the base..........5. *Camelina*
        e. Pod compressed, lanceolate to linear-oblong, usually twisted, 10-18 mm. long..........6. *Draba*
      d. Pubescence simple or none; pods subglobose or cylindrical; seeds minute, turgid..........7. *Rorippa*
    c. Pod much more than 3 times as long as broad.
      d. Seeds in 2 rows in each cell.
        e. Leaves toothed or runcinate-lyrate; plants glabrous or sparingly hispid..........9. *Diplotaxis*
        e. Leaves finely dissected; pubescence of forked hairs..........12. *Descurainia*
      d. Seeds in 1 row in each cell.
        e. Leaves elliptical, entire, sessile, auriculate-clasping..........15. *Conringia*
        e. Leaves otherwise, not clasping.
          f. Petals 7-15 mm. long; silique produced into a stout often 1-seeded beak..........10. *Brassica*

f. Petals smaller; silique tipped with the short slender style, or style none.
g. Seeds flat; siliques 4-angled, the valves keeled; leaves waxy in texture, shining, glabrous, shallowy crenate........................11. *Barbarea*
g. Seeds globose or oblong; siliques and leaves otherwise.
h. Leaves runcinate or deeply pinnatifid; hairs simple....13. *Sisymbrium*
h. Leaves finely dissected; pubescence of forked hairs....12. *Descurainia*
h. Leaves entire or slightly toothed; stem-hairs vertical, attached by the middle, appressed..................................14. *Erysimum*

b. Petals white or purplish.
c. Pod short, not more than 3 times as long as broad.
d. Pod compressed at right angles to the narrow partition (the sutures appearing on the broad faces).
e. Carpels thickish, tuberculate-crested or deeply wrinkled......16. *Coronopus*
e. Carpels compressed, smoothish.
f. Pods triangular-obcordate, the valves wingless; seeds 10-12 in each cell ....17. *Capsella*
f. Pods ovate, oval or orbicular, the valves winged.
g. Seeds 2-8 in each cell; pods 8-12 mm. broad, deeply notched at top.... ....18. *Thlaspi*
g. Seed 1 in each cell; pods 2 mm. broad.....................19. *Lepidium*
d. Pod compressed (if at all) parallel to the broadish partition.
e. Pods scarcely flattened.
f. Pods canescent-pubescent, elliptic, plump, 2·5-3·5 mm. thick; leaves pale green, lanceolate, entire.....................................20. *Berteroa*
f. Pods glabrous, globular.
Plant submersed, 2-10 cm. high; flowers few, on a naked scape; leaves tufted, awl-shaped, 1-3 cm. long..........................22. *Subularia*
Plant not submersed, 6-10 dm. high from deep thick roots; flowers many, in panicled racemes; basal leaves 15-30 cm. long, oblong....23. *Armoracia*
e. Pods flattened; plants usually stellate-pubescent..................6. *Draba*
c. Pod more than 3 times as long as broad.
d. Stem-leaves 2, opposite, trifoliolate; rootstock long; woodland plants...... ....24. *Dentaria*
d. Stem-leaves many, simple or pinnately divided.
e. Petals 15-20 mm. long, purplish or rarely white; leaves simple, ovate-lanceolate, 8-13 cm. long, sharply denticulate....................21. *Hesperis*
e. Petals smaller, white or purple-tinged.
f. Plants glabrous or with a few simple hairs.
g. Stems erect, unbranched or branched only near the top, the leaves chiefly basal; pods straight, flattened, the seeds in 1 row in each cell ....25. *Cardamine*
g. Stems often floating, much branched, leafy; seeds in 2 rows in each cell ....8. *Nasturtium*
f. Plants pubescent, the hairs at least in part branched; leaves simple, the basal in dense rosettes.
g. Pods linear, 1·5-12 cm. long..................................26. *Arabis*
g. Pods lanceolate to narrowly oblong, rarely over 13 mm. long....6. *Draba*

1. NESLIA Desv.
(Ball Mustard)

1. N. PANICULATA Desv. [T]

Railway ballast (Bic); cultivated fields (Rim.; Ste. Luce; Mét.; Car.); waste ground (Méchins; Cap Chat; Trl.; Marsouins; Drt.).

European: naturalized in temperate N.A. from B.C. to e. Que., southward in the East to Pa.

2. RAPHANUS (Tourn.) L.
(Radish)

a. Flowers white or purplish; pods 2-3 seeded, the seed-bearing part short and thick, scarcely moniliform, at maturity often 10 mm. thick...................1. *R. sativus*

a. Flowers pale yellow, turning whitish or purplish; pods 4-10-seeded, the seed-bearing part longer and more slender, moniliform, 2-3 mm. thick..........2. *R. Raphanistrum*

1. R. SATIVUS L. [T] Radish

Sea beach (Bic; Fla.).

Eurasian: escaped from cultivation in N.A.

2. R. RAPHANISTRUM L. [T] Wild Radish. Jointed Charlock

Waste field by the sea (Newport); field (Pcé.).

Eurasian: naturalized in N.A. from Ont. to Nfld. and southwards.

3. RAPISTRUM Desv.

1. R. RUGOSUM (L.) Allioni. [T] Coste, Fl. de France 1: 141. 1901; *See* Clausen, Rhod. 42: 201-202. 1940.

Waste places and ballast (Mét.).

Eurasian: adventive in Oreg. and Calif.; e. Que., Mass., N.Y., N.J., and Pa.

4. CAKILE (Tourn.) L.
(Sea Rocket)

1. **C. edentula** (Bigel.) Hook, var. **typica** Fernald, Rhod. 24: 23. 1922. [T]

Psammophilous halophyte: sea beaches (Bic; Ste. Luce; Fla.; Baie des Sables; Cld.; Mad.; Pén.; Pas.; Car.). General in its habitat.

Boreal eastern American (maritime): Great Lakes region (with var. *lacustris* Fernald); e. Que. to s. Lab. and Nfld., southw. along the coast to Fla.; Iceland; Azores. Closely related to the European *C. maritima* Scop.; along the Pacific coast replaced by var. *californica* (Heller) Fernald.

5. CAMELINA Crantz
(False Flax)

a. Pods 6-7 mm. broad, on pedicels 1·2-3 cm. long; plant glabrous or nearly so..1. *C. sativa*

a. Pods 4-5 mm. broad, on pedicels 8-18 mm. long; plant pubescent, at least below ....2. *C. microcarpa*

1. C. SATIVA (L.) Crantz. [T]

Vegetable gardens (Luceville; Mtn.); ballast-filling about fish-houses (Yrk.).

European: introduced in temperate N.A.

2. C. MICROCARPA Andrz. [T]

Railway ballast (Mat.).

European: introduced in temperate N.A.

6. DRABA (Dill.) L.

[Fernald: Draba in temperate northeastern America; Rhodora 36: 241-261; 285-305; 314-344; 353-371; 392-404. 1934.]

a. Flowering stem a slender scape, including the mature raceme 0·1-1 dm. high, rising from a basal rosette; leaves of the rosette 1-4·5 mm. wide; siliques 2·7-9 mm. long.

b. Expanding leaves glabrous; mature leaves loosely ciliate along the margins with deciduous hairs; siliques glabrous, oblong-lanceolate, acute to acuminate, the valves reticulate-veiny, 2·7-7 mm. long; seeds 0·7-1·1 mm. long........1. *D. Allenii*

b. Leaves and scapes canescent-pannose with minute stellate trichomes.

c. Siliques glabrous, 4-9 mm. long, lanceolate to narrowly oblong; style 0·3-0·4 mm. long; seeds 14-28, 0·7-1 mm. long; leaves cuneate-obovate to broadly oblanceolate, obtuse..2. *D. nivalus*

c. Siliques stellate-hirtellous, 3-5·5 mm. long, elliptic; style 0·8-1 mm. long; seeds 8-10, 1·2-1·8 mm. long; leaves linear or linear-oblanceolate, acute....3. *D. Peasei*

a. Flowering stems with 1-many leaves above the basal rosette, mostly taller; basal leaves 0·5-9 cm. long, 0·1-1·8 cm. broad; siliques 0·25-1·8 cm. long.

b. Petals deep yellow (fading in drying); ovaries and siliques densely pilose; siliques lanceolate to linear-oblong, 1-1·8 cm. long, 2-4 mm. broad, usually twisted; style 1-1·5 mm. long; cauline leaves 7-25, 2-30 mm. broad........4. *D. minganensis*

b. Petals white; ovaries and siliques glabrous or variously short-pubescent; siliques linear-lanceolate to ovate or short-oblong, 2·5-12 mm. long (if strongly twisted and more than 12 mm. long, glabrous or minutely stellate-tomentulose); cauline leaves 1-95.

c. Biennial; lower leaves of the rosettes shrivelling soon after anthesis, the rosette-leaves similar to the lower cauline ones; the subspherical rosette of the first year elongating to form the very leafy flowering stem; axis of racemes and pedicels densely villous; style short or none.

d. Siliques glabrous..5. *D. incana*

d. Siliques pubescent...............................5a. *D. incana*, var. *confusa*

c. Perennial; branches of the caudex usually invested below with fibrous shreds of old leaves; new basal rosettes usually well developed at flowering time, their leaves unlike those of the stem; axis of raceme and pedicels glabrous or sparingly pubescent.

d. Foliage with simple or elongate and irregularly forking trichomes; siliques glabrous.

e. Foliage with numerous stellate and several to few simple and elongate trichomes (these sometimes wanting); rosette-leaves cuneate-oblanceolate, 4-9 mm. wide...6. *D. laurentiana*

e. Foliage with numerous simple or elongate and forking trichomes; rosette-leaves linear-oblanceolate, 1-5 mm. wide.....................7. *D. clivicola*

d. Foliage with close stellate pubescence, simple trichomes wanting or only rarely present (except as cilia) on the rosette-leaves.

e. Siliques plump, ovoid, ellipsoid or oblong, 2·5-10 mm. long, glabrous; seeds closely but irregularly imbricated.......................8. *D. pycnosperma*

e. Siliques strongly flattened (except in *D. lanceolata*, which has densely tomentulose valves) ovate to lanceolate to linear, 5-15 mm. long, glabrous or pubescent; seeds not imbricated, lying flat against the septum.

f. Siliques glabrous or only sparsely hirtellous or scabrous, strongly flattened; racemes usually bractless.

g. Mature siliques definitely veiny, flattish, plane; style obsolete or thick and short; fruiting pedicels stoutish, short, the lowest 1-6 mm. long; cauline leaves mostly rounded at base, oblong, ovate or obovate.

h. Siliques narrowly to broadly lanceolate, acute or subacute, 1·5-3 mm. wide; seeds 0·7-1 mm. long.

Cauline leaves 1-5; longer racemes mostly with 5-15 siliques...9. *D. glabella*

Cauline leaves 5-8; longer racemes mostly with 10-35 siliques..9a. *D. glabella*, var. *orthocarpa*

h. Siliques elliptic to oblong-ovate, obtuse, 2·5-5 mm. wide; seeds 1-1·3 mm. long..........................9b. *D. glabella*, var. *megasperma*

g. Mature siliques scarcely or only obscurely veiny, oftenest twisted, very thin; style slender, 0·5-1 mm. long; fruiting pedicels slender, the lowest 3-15 mm. long; cauline leaves narrowed or only slightly rounded at base, oblanceolate, oblong or narrowly obovate.

h. Siliques narrowly lanceolate to narrowly elliptic or ovate, 5-15 mm. long, 1·5-3 mm. broad; stem 0·5-4·5 dm. high........10. *D. arabisans*

h. Siliques elliptic-ovate, 3-8 mm. long, 2-4 mm. broad; stem 0·7-1·5 dm. high..............................**10a.** ***D. arabisans*, var. *canadensis***

f. Siliques densely stellate-tomentulose, only slightly compressed; racemes usually leafy-bracted at base; pedicels strongly ascending in fruit...... ....11. *D. lanceolata*

1. **D. Allenii** Fernald, Rhod. 36: 289. 1934. [Ch (semi-shrubby)]

Calcicole: calcareous cliffs (Tbl.); cold, bare or mossy alpine schistose cliffs and talus (Log.; Mtt. (type station); Ftn.; Pem.).

Local endemic, alpine; representative of the arctic circumpolar and alpine *D. fladnizensis* and *D. lactea.*

2. **D. nivalis** Liljebl. [Ch (semi-shrubby)]

Calcicole: sea cliffs and talus (Srl.); cold and moist alpine schistose cliffs and talus (Log.; Mtt.; Pem.; Ftn.; Bln.).

Arctic circumpolar, alpine: Aleutian Is., Alaska, Yukon, Mack., Herschel I., Melville I., Victoria I., King William I., Ellesmere, Baffin, Melville Pen., n. Lab., and n. Nfld., and in the mts. of Gaspe; w. and e. Greenland; Iceland; Spitsbergen; arctic and alpine Eurasia.

3. **D. Peasei** Fernald, Rhod. 36: 298. 1934 [Ch (semi-shrubby)]

Calcicole: sea cliffs and talus slopes (Lbn.) (type station).

Local endemic; representative of the cordilleran *D. oligosperma* and *D. incerta.*

4. **D. minganensis** (Victorin) Fernald. [Ch (semi-shrubby)] (*D. luteola* Greene, var. *minganensis* Victorin, Contrib. Lab. Bot. Univ. Montréal, No. 12: 174. 1928.)

Calcicole: seaside boulders, cliffs, and talus (Bic).

Boreal eastern American: James Bay, Mingan Is., e. Que.; representative of the arctic circumpolar *D. aurea.*

5. **D. incana** L. [Hsr]

Calcicole: seaside boulders and bare or turfy sea cliffs (Cap Chat; Clr.; For.; Gpe.; Pcé.; Bon. I.).

Boreal circumpolar: gap in western N.A.; s. coast of Hudson Bay (Fort Severn), James Bay, Lab., and Nfld., southw. to Lake Superior and Gaspe; Greenland; Iceland; Faeroes; Eurasia.

5a. **D. incana,** var. **confusa** (Ehrh.) Liljebl.

Calcicole: boulders and sea cliffs (Anse Jersey; Pcé.; Bon. I.).

Boreal American: James Bay to Lab. and Nfld., southw. to e. Que. and N.B.; Greenland.

6. **D. laurentiana** Fernald, Rhod. 36: 328. 1934. [Ch (semi-shrubby)]

Calcicole: slaty sea cliffs (Prr.).

Gulf endemic: Gaspe Peninsula, Côte Nord, and Nfld.

7. **D. clivicola** Fernald, Rhod. 36: 326. 1934. [Ch (semi-shrubby)]

Calcicole: cold, moist or dry, schistose alpine cliffs and talus (Log.; Mtt. (type station); Pem.; Bln.).

Local endemic, alpine; representative of the arctic circumpolar *D. norvegica* and *D. rupestris.*

8. **D. pycnosperma** Fern. & Knowlt. [Ch (semi-shrubby)]

Calcicole: boulders and moist or dry sea cliffs and talus (Trl.; Srl.; For.; Pcé. (type station); Bon. I.).

Gulf endemic: Gaspe, n. Nfld.

9. **D. glabella** Pursh. [Ch (semi-shrubby)]

Calcicole: moist or dry sea cliffs and talus (Bic; Gro.; Cap.; Trl.; Srl.; Prr.; Cap au Renard; Marsouins; Cld.; Mad.; Tng.; Pcé.; Dou.).

Arctic American: n. coast of Alaska, Yukon, Mack. (Mack. R. Delta, Great Bear L., Coronation Gulf), Devon, n. and s. Baffin, Hudson Bay (Chesterfield Inlet, Southampton I., Hudson Str.), n. Lab., and Nfld., southw. to n. B.C., James Bay, and s. Que. (Mt. St. Hilaire, Rouville co.).

9a. **D. glabella,** var. **orthocarpa** (Fern. & Knowlt.) Fernald.

Calcicole: sea cliffs and talus (Bic (type station); Méchins; Trl.; Prr.; Plr.; Pointe du Gros Mâle; Clr.; Pcé.).

Arctic eastern American: Hudson Bay (Churchill), Devon, e. Que.

9b. **D. glabella,** var. **megasperma** (Fern. & Knowlt.) Fernald.

Calcicole: sea cliffs and talus (Cap.; Trl.; Prr.; Gros Crepaud); dry gravel beach (Pas.) (type station).

Gulf endemic: Gaspe and n. N.B., Anticosti, Mingan Is., Côte Nord, s. Lab., and Nfld.

10. **D. arabisans** Michx. [Ch (semi-shrubby)]

Calcicole: boulders and dry sea cliffs and talus (Bic; Rim.; Méchins; Trl.; Srl.; Prr.; Plr.; Lbn.; Ros.; For.; Gpe.; Dou.; Pcé.; Bon. I.); inland cliffs (Tra.); cliffs above lake (Lac Pleureuse); river ledges (Ren.; Drt.; Gnd.; Mat.).

(Boreal-)temperate eastern American: Great Lakes region to Mingan Is., Anticosti, and Nfld., southw. to Me., Vt., and N.Y.

10a. **D. arabisans,** var. **canadensis** (Brunet) Fern. & Knowlt.

Calcicole: sea ridges (Bic).

Scattered locally throughout the range of the species. Keewatin.

11. **D. lanceolata** Royle. [Ch (semi-shrubby)]

Calcicole: boulders and dry sea cliffs and ridges (Bic; Rim.; Prr.; Lbn.; For.); inland cliffs (Tra.).

(Arctic-)boreal circumpolar: Alaska (Seward Pen.), Yukon, Mack. (Mack. R. Delta, Great Bear L., Coronation Gulf), James Bay, and e. Que., southw. to Utah, Colo., N. Mex., Wis., Mich., Vt., N.H., and N.B.; northern and alpine Asia (in the Alps and in E. Caucasus the closely related *D. stylaris* J. Gay).

7. RORIPPA Scop.
(Marsh Cress)

a. Pods short-ellipsoid to globular, less than twice as long as broad; leaves thickish, the lower merely somewhat pinnatifid or runcinate at base, the upper coarsely toothed to sub-entire..1. *R. islandica,* var. *hispida*

a. Pods ellipsoid, arcuate, more than twice as long as broad; leaves very thin, deeply pinnate..1a. *R. islandica,* var. *Fernaldiana*

1. **R. islandica** (Oeder ex Murr.) Borbas, var. **hispida** (Desv.) Butters & Abbe. [Hs] (*Radicula palustris*, var. *hispida* Robinson; *Rorippa palustris*, var. *hispida* (Desv.) Rydberg; *R. palustris*, var. *glabrata* (Lunell) Victorin; *See* Contrib. Lab. Bot. Univ. Montréal, No. 17: 1-17. 1930; Rhod. 30: 131. 1928; 42: 25-32. 1940; 42: 267-274. 1940.)

Dried pool (Bic); edge of stream (Bic); river shore (Pab.).

Boreal American: Alaska, Yukon, Mack. (Great Bear L., Great Slave L.), Hudson Bay (Churchill), Lab., and Nfld., southw. to Wash., Ariz., N. Mex., and Fla.; e. Asia; the whole species boreal circumpolar.

1a. **R. islandica,** var. **Fernaldiana** Butters & Abbe. (*R. islandica*, var. *microcarpa* (Regel) Fern.; *See* Fernald, Rhod. 42: 271. 1940; 50: 100. 1948.)

River shore (GCa.).

Range of var. *hispida*.

8. NASTURTIUM R. Br.
(Water Cress)

1. N. OFFICINALE R. Br. [HH]

Ditch water (Pcé.).

Eurasian: originally cultivated, now widely distributed in temperate N.A.

9. DIPLOTAXIS DC.

a. Sepals erect; flowers yellow; style linear; leaves oblong, toothed or sinuate-lobed or somewhat pinnatifid........1. *D. muralis*

a. Sepals spreading; petals white, streaked with pink; style sword-shaped; basal and lower stem-leaves lyrate, the upper sessile, oblong, sinuate or incised-dentate........2. *D. erucoides*

1. D. MURALIS (L.) DC. [T] Sand Rocket

Ballast-filling about fish-houses (Yrk.).

European: adventive in temperate eastern N.A.

2. D. ERUCOIDES (L.) DC. [T]

Ballast-filling about fish-houses (Yrk.).

European: adventive in temperate eastern N.A.

10. BRASSICA (Tourn.) L.

a. Upper stem-leaves clasping; leaves glaucous, glabrous or the lower with a few scattered hairs........1. *B. campestris*

a. Upper stem-leaves not clasping.
  b. Beak of the pod terete, slender, much narrower than the pod, without seeds in its base.
    c. Pods 3-7 cm. long, 2-3·5 mm. thick, rather 4-sided, spreading, the beak 6-12 mm. long; pedicels 7-10 mm. long........2. *B. juncea*
    c. Pods 1-2 cm. long, about 1 mm. thick, appressed to the axis of the inflorescence, the beak 1·5-3 mm. long; pedicels 3-6 mm. long........3. *B. nigra*

b. Beak of the pod flattish, about as wide as the pod, often with a seed in the base.
  c. Mature silique scarcely or only slightly torulose, 2·5-3·7 cm. long, 2·5-3·5 mm. thick..4. *B. Kaber*, var. *pinnatifida*
  c. Mature silique strongly torulose, 3-5·5 cm. long, 1·5-2 mm. thick ....4a. *B. Kaber, var. Schkuhriana*

1. B. CAMPESTRIS L. [Hs] Field Mustard
Waste places (Dou.; Pcé.; Nou.).
European: naturalized throughout temperate N.A.

2. B. JUNCEA (L.) Cosson. [T] Indian Mustard
Beach at river mouth (Gnd.); garden (Rim.); waste places (Srl.; Mat.).
Eurasian: widely introduced in temperate N.A.

3. B. NIGRA (L.) Koch. [T] Black Mustard
Waste places (Mét.).
Eurasian: widely introduced in temperate N.A.

4. B. KABER (DC.) Wh., var. PINNATIFIDA (Stokes) Wh. [T] (*B. arvensis* (L.) Rabenhorst; *See* Wheeler, Rhod. 40: 306-309. 1938.) Wild Mustard
Waste places (Mét.; Ann.; Trl.; Plr.; Yrk.).
European: widely introduced in temperate N.A.

4a. B. KABER, var. SCHKUHRIANA (Reich.) Wheeler. (*B. arvensis*, var. *Schkuhriana* (Reich.) Thellung; *See* Wheeler, Rhod. 40: 308. 1938.)
Fields and waste places (Gpe.; Pcé.).
European: widely introduced in temperate N.A.

11. BARBAREA R. Br.

(Winter Cress)

a. Divisions of the basal leaves 1-2 small pairs; pods slender, ascending; petals 2-4 mm. long; pedicels 2-3 mm. long; styles scarcely 0·5 mm. long............1. *B. orthoceras*
a. Divisions of the basal leaves 3-4 pairs; pods stouter, erect or strongly ascending; petals, pedicels and styles longer.
  b. Pedicels ascending to appressed or erect; siliques erect or strongly ascending, closely overlapping, the raceme dense..............................2. *B. vulgaris*
  b. Pedicels spreading; siliques arcuate-ascending to horizontally divergent, not imbricated, the raceme lax and open..................2a. *B. vulgaris*, var. *arcuata*

1. **B. orthoceras** Ledeb. [Hs] (*B. vulgaris* Cham.)
Alpine schistose talus and slopes (Log.; Mtt.; Pem.).
Boreal American: Aleutian Is., Alaska, Yukon, Mack. (Mack. R. Delta, Great Bear L.), n. Sask., Lab., and Nfld., southw. to Calif., Ariz., Colo., Great Lakes region, N.H., and Me.; e. Asia.

2. B. VULGARIS R. Br. [Hs] (*B. stricta* of Gray's Man., ed. 7; *See* Fernald, Rhod. 45: 304. 1943.)
Edge of stream in slaty field (Bic).
European: widely distributed in temperate N.A.

2a. B. VULGARIS, var. ARCUATA (J. & C. Presl) Fries. (*B. vulgaris* of Gray's Man., ed. 7; *See* Fernald, Rhod. 45: 304. 1943.)

Thicket at base of sea cliffs (Plr.); river gravels (Pab.); wet ground (Gpe.).

European: widely distributed in temperate N.A.

12. DESCURAINA Webb & Berth.

[Detling: Revision of the North American species of Descurainia; Amer. Midland Nat. 22: 481-520. 1939.]

a. Siliques clavate, 5-10 mm. long; seeds biseriate, 5-10 in each locule; fruiting pedicels 8-16 mm. long, spreading about 45 degrees; flowers yellow, the calyx 1·5-2·5 mm. long, exceeded by about 0·5 mm. by the corolla; leaves dark green, from simply pinnate to bipinnate or the lower ones often again pinnatifid, the segments of the upper ones mostly linear, those of the lower ovate to linear; plant pubescent, glandular...1. *D. pinnata,* var. *brachycarpa*

a. Siliques linear; seeds strictly uniseriate; plants non-glandular.
  b. Leaves 2-3-pinnate; flowers yellow, the calyx 2-2·5 mm. long, about equalling the corolla; fruiting pedicels 8-15 mm. long, spreading about 45 degrees; siliques 10-30 mm. long; seeds 10-20 in each locule; plant from sparsely to quite densely stellate-pubescent...2. *D. Sophia*
  b. Leaves simply pinnate (to again pinnatifid in the lower); flowers pale yellow, the calyx 1-1·5 mm. long, about equalling the corolla; fruiting pedicels 3-6 mm. long, spreading about 5-20 degrees; siliques 5-10 mm. long; seeds 4-8 in each locule; whole plant canescent......................................3. *D. Richardsonii*

1. **D. pinnata** (Walt.) Britton, var. **brachycarpa** (Richards.) Fernald. [Hs] (*Sisymbrium brachycarpum* Richards.; *S. canescens,* var. *brachycarpum* (Richards.) Wats.; *S. pinnatum,* var. *brachycarpum* (Richards.) Jepson; *D. pinnata,* subsp. *brachycarpa* (Richards.) Detling; *See* Fernald, Rhod. 42: 266. 1940.)

Sandy border of salt marsh near river mouth (Ann.); habitat not stated (Trl.; Mad.). (The basis of Gaspe citations of *D. intermedia.*)

Boreal American: Mack. (Great Slave L.) to e. Que., southw. to Calif., Tex., Mo., and Tenn.

2. D. SOPHIA (L.) Webb. [T] (*Sisymbrium Sophia* L.)

Sandbar at river mouth (Mad.); roadsides and waste places (Lou.; Plr.).

Eurasian: naturalized throughout temperate N.A.; w. Greenland.

3. **D. Richardsonii** (Sweet) O. E. Schulz. [T] (*Sisymbrium canescens* Richards.; *S. Richardsonii* Sweet.)

Calcareous sea cliffs (Srl.; Bon. I.); weed on wharf (Dan.). (Some specimens distributed as *D. Hartwegiana,* a Mexican species.)

Disjunct American: Yukon, Mack. (Great Slave L.), s. Keewatin, southw. to B.C., Idaho, and Colo.; Great Lakes region; Gaspe Peninsula.

13. SISYMBRIUM (Tourn.) L.
(Tumble Mustard)

a. Pods 1-1·5 cm. long, thick-walled, scarcely stalked, appressed; petals 2-3 mm. long, bright yellow; leaves runcinate.......................1. *S. officinale,* var. *leiocarpum*

a. Pods 6-10 cm. long, rigid, divergent, hardly thicker than the short thickish pedicels; petals 5-8 mm. long, pale yellow; leaves finely divided into linear lobes...2. *S. altissimum*

1. S. OFFICINALE (L.) Scop., var. LEIOCARPUM DC. [T]
In vegetable garden (Gpe.).
European: naturalized in temperate eastern N.A.

2. S. ALTISSIMUM L. [Hs]
Railway ballast (Mat.); waste places (Bic; Rim.; Ann.; Trl.; Drt.).
European: naturalized throughout temperate N.A.

14. Erysimum (Tourn.) L.
(Treacle Mustard)

a. Fruiting pedicels very slender, about 10 mm. long; pods 15-25 mm. long, glabrous or essentially so; style small; petals 4-5 mm. long; leaves lanceolate or oblanceolate, 2·5-5 cm. long, entire or sinuate-denticulate; stems erect, 2-5 dm. high, sparsely puberulent; annual..1. *E. cheiranthoides*

a. Fruiting pedicels stout, shorter; pods 3-6 cm. long, canescent; style nearly as thick as the pod; leaves linear to narrowly oblanceolate, entire to sparingly dentate; stems canescent; perennials.
  b. Fruiting pedicels 4-6 mm. long; pods 2-4 cm. long; petals 6-8 mm. long..2. *E. inconspicuum*
  b. Fruiting pedicels 5-9 mm. long; pods 3-6 cm. long; petals 4·5-6 mm. long..3. *E. coarctatum*

1. **E. cheiranthoides** L. [T] Worm-seed Mustard

Sea cliffs (Rim.; Prr.; Clr.); gravel spit (Pas.); seashore (Mad.); waste places (Lac du Club; Bon.; Zén.).

Boreal circumpolar: Alaska, Yukon, Mack. (Great Bear L., Great Slave L.), Hudson Bay (Churchill), Nfld., southw. to Calif., Utah, Mo., and N.C.; arctic and alpine Eurasia.

2. **E. inconspicuum** (S. Wats.) MacM. [Hs] (*E. parviflorum* Nutt.; *E. asperum*, var. *inconspicuum* S. Wats.) Small-flowered Prairie-rocket

Calcicole: slaty field (Bic).

(Arctic-)boreal American: Alaska, Yukon, Mack. (Coronation Gulf, Great Slave L.), to e. Que., southw. to Nev., Colo., Kans., Minn., and Ont.

3. **E. coarctatum** Fernald, Rhod. 29: 141. 1927. [Hs]

Calcicole: sea cliffs and talus (For.).

Gulf endemic: Gaspe, Anticosti, Mingan Is., Nfld.; with *E. asperum* DC., temperate American; the latter has much larger flowers and pods (petals about 1 cm. long, mature pods about 10 cm. long).

15. Conringia (Heist.) Adans.
(Hare's-ear Mustard)

1. C. ORIENTALIS (L.) Dumort. [T]
Railway ballast (Rim.; Mat.); waste ground (Ann.; Trl.).
European: naturalized throughout temperate N.A.

16. CORONOPUS Ludwig

(Wart Cress. Swine Cress)

a. Fruit notched at the summit, so that the two nutlets are distinct; nutlets rough-wrinkled..1. *C. didymus*

a. Fruit not notched at the summit, so that the two nutlets seem like two halves of a sphere; nutlets tubercled..2. *C. procumbens*

1. C. DIDYMUS (L.) Sm. [T]

Ballast-filling about fish-houses (Yrk.); on wharf (Gpe.).

Eurasian: introduced throughout temperate N.A.

2. C. PROCUMBENS Gilibert. [T]

On wharf (Gpe.).

Eurasian: much rarer than the preceding species.

17. CAPSELLA Medic.

(Shepherd's Purse)

1. C. BURSA-PASTORIS (L.) Medic. [T]

Fields (Bic); bare rocks (Val.; For.); gravels of spit (Pas.); railway ballast (Mad.; Mat.). General and very common.

European: naturalized throughout temperate N.A.

18. THLASPI (Tourn.) L.

(Penny Cress)

1. T. ARVENSE L. [T]

Gravel pit (Canton Jetté); railway ballast (Mat.); fields and waste places (Bic; Mét.; R. Blanche).

European: naturalized throughout temperate N.A.

19. LEPIDIUM (Tourn.) L.

(Pepper Grass)

a. Pods orbicular, minutely wing-margined at the top; fruiting pedicels slender, wide-spreading; stamens 2; petals minute or none; lower leaves not bipinnatifid; plant green..1. *L. densiflorum*

a. Pods ovate, winged all around; fruiting pedicels thickish, compressed, ascending; stamens 6; petals present, often pinkish; lower leaves bipinnatifid; plant very glaucous.. 2. *L. sativum*

1. L. DENSIFLORUM Schrad. [T] (*L. apetalum* of Gray's Man., ed. 7.)

Railway ballast (Mat.); slaty field (Bic); roadside (Lac Pleureuse); beach (Pte. au Père).

Eurasian: naturalized throughout temperate N.A.

2. L. SATIVUM L. [T]

Sea beach (Baie des Sables); roadside (Trl.; Gnd.); waste heap (Ann.).

European: introduced and tending to escape from cultivation in temperate N.A.

20. BERTEROA DC.
(Hoary Alyssum)

1. B. INCANA (L.) DC. [Hs] (*Alyssum incanum* L.)
Waste places (Mét.).
European: naturalized in temperate N.A. from Minn. to e. Que., southw. to Mo.

21. HESPERIS (Tourn.) L.

1. H. MATRONALIS L. [Hs] Dame's Violet
Roadside (Pcé.).
European: cultivated and escaping.

22. SUBULARIA L.
(Awlwort)

1. **S. aquatica** L. [T]
Shallow waters of Lac des Américains (Tbl.).
Arctic circumpolar: Alaska, Yukon, Mack. (Great Bear L.), Keewatin, s. Lab., and Nfld., southw. to Calif., Nev., Utah, and Me.; e. Greenland; Iceland; Faeroes; arctic Eurasia.

23. ARMORACIA Gaertn.
(Horseradish)

1. A. LAPATHIFOLIA Gilib. [Grt] (*A. rusticana* Gaertn.)
Roadside ditches (Bic; Rim.; Pte. au Père; Mét.; Trl.; Dan.).
European: widespread in e. N.A.

24. DENTARIA (Tourn.) L.
(Pepperroot. Crinkleroot)

1. **D. diphylla** Michx. [Grh]
Woods (Mtn.; Cap Chat; Ann.; Srl.; Prr.; Plr.; Pcé.; Gnd.; Bon.; GCa.; Nou.).
Temperate eastern American: Minn. to e. Que., southw. to Ky. and S.C.

25. CARDAMINE (Tourn.) L.
(Bitter Cress)

a. Leaves simple, 6-15 mm. long, on very long petioles, ovate, entire; flowers white; pods 2-3 cm. long, upright; alpine tufted plant 4-11 cm. high........1. *C. bellidifolia*

a. Leaves pinnately divided.
  b. Flowers showy, white, 1-2 cm. broad; terminal leaflet of the basal leaves entire or obscurely toothed; lateral leaflets of the middle and upper cauline leaves usually with a distinct petiolule....................2. *C. pratensis,* var. *palustris*
  b. Flowers small, about 4 mm. broad; leaflets 7-11, the terminal one obovate, the lateral oblong, tending to be confluent along the rhachis........3. *C. pensylvanica*

1. **C. bellidifolia** L. [Ch(passive)] Alpine Bitter Cress

Alpine rivulet above Lac des Américains (Tbl.); cold mossy alpine cliffs (Log.; Mtt.). (All forma *laxa* (Lange) Polunin, Can. Field-Nat. 54: 35. 1940.)

Arctic circumpolar, alpine: Aleutian Is., Alaska, Yukon, Mack., Ellesmere, Devon, Baffin, Melville, n. Lab., southw. in the mts. to Oreg. and N.H.; w. n., and e. Greenland; Iceland; Spitsbergen; arctic and alpine Eurasia.

2. **C. pratensis** L., var. **palustris** Wimm. & Grab. [Hs] (*See* Fernald, Rhod. 22: 11-14. 1920.) Cuckoo Flower

Cedar swamp (Oie); brackish shores (Drt.).

(Arctic-)boreal circumpolar: n. B.C., Mack. (Great Slave L.), Hudson Bay (Churchill), n. Lab., and Nfld., southw. to n. Ind. and N.J.; Eurasia.

3. **C. pensylvanica** Muhl. [T]

Wet places (Bic; Rim.; Ann.; Srl.; Lou.; Cld.; Drt.; Yrk.; Gnd.; Cha.; GCa.; Nou.; Mat.); subalpine woods and wet places (Alb.; Tbl.; Log.; Mtt.; Lyl.; Bln.). General.

Boreal American: s. Alaska, Yukon, and Mack. to Lab. and Nfld., southw. to Mont., Kans., and Fla.

26. ARABIS L.

(Rock Cress)

[Hopkins: Arabis in eastern and central North America; Rhodora 39: 63-98; 106-148; 155-186. 1937. Rollins: A monographic study of Arabis in western North America; Rhodora 43: 289-325; 348-411; 425-481. 1941.]

a. Mature fruiting pedicels erect, ascending or widely divergent, but not definitely descending or deflexed; flowering pedicels at anthesis erect, ascending or widely divergent.
  b. Mature siliques erect or ascending, often appressed or subappressed to the main stem, straight or curved inward; fruiting pedicels erect or ascending.
    c. Mature siliques 1-nerved only at the base, often only faintly so, 4-7 cm. long; seeds in only 1 row, orbicular, averaging 1·25 mm. in diameter, narrowly winged all around; flowers in close racemes; petals white to deep cream-colour, 7-9 mm. long, 2-4 mm. broad at apex, delicately veined......................1. *A. alpina*
    c. Mature siliques 1-nerved at least to the middle or well beyond; flowers in loose racemes.
      d. Seeds uniseriate; siliques strictly erect, 3-5 cm. long; petals white to yellowish white, 3-5 mm. long, 0·75-1 mm. broad at apex; stems hirsute with simple or forked trichomes..........................2. *A. hirsuta,* var. *pycnocarpa*
      d. Seeds biseriate, at least when young.
        e. Fruiting pedicels merely ascending or widely divergent, finely stellate-pubescent to glabrous; petals pinkish to pale purple, rarely white, 5·5-8 mm. long, 0·5-1·5 mm. broad at apex; stem finely appressed-pubescent at base with forked trichomes.
          f. Siliques 1·25-2·25 mm. broad............................3. *A. divaricarpa*
          f. Siliques 0·75-1·25 mm. broad............3a. *A. divaricarpa,* var. *stenocarpa*
        e. Fruiting pedicels strictly appressed or sub-appressed, always glabrous; siliques 1·5-3 mm. broad; petals pink to purple (often white when dried), 5-10 mm. long, 0·5-2 mm. broad at apex; stem glabrous or rarely very scantily hirsutulous at extreme base.....................4. *A. Drummondi*
  b. Mature siliques widely divergent, subarcuate or subreflexed; fruiting pedicels ascending or widely divergent; basal leaves finely stellate-pubescent on both surfaces..3. *A. divaricarpa*

a. Mature fruiting pedicels pendulous or reflexed; flowering pedicels at anthesis reflexed or at least somewhat descending; petals white to pinkish or lilac-purple, 1·75-2·25 mm. broad at apex.

b. Lower stem appressed-pubescent with small or minute hairs; petals 7-10 mm. long ....5. *A. Holboellii*

b. Lower stem hirsutulous with large spreading hairs; petals 5-7 mm. long.......... ....5a. *A. Holboellii,* var. *Collinsii*

1. **A. alpina** L. [Hs]

Calcicole: in tall grass on wet roadside ledges (Srl.; Marsouins); river ledges and gravels (Ann.; GCa.); calcareous alpine meadow (Tbl.); edge of alpine rivulet above Lac des Américains (Tbl.); edge of subalpine lake (Lac St. Anne); moist alpine slopes (Alb.; Tbl.; Lac Ste. Anne).

Arctic circumpolar, alpine: gap in western N.A.; Somerset I., Baffin, Hudson Bay, n. Lab., Nfld., Côte Nord, Gaspe; w., s., and e. Greenland; Iceland; Spitsbergen; arctic and alpine Eurasia.

2. **A. hirsuta** (L.) Scop., var. **pycnocarpa** (Hopkins) Rollins. [Hs] (*A. pycnocarpa* Hopkins in Rhod. 39: 112. 1937; *A. pycnocarpa,* var. *reducta* Hopkins in Rhod. 39: 117. 1937, based upon a pathological monstrosity.)

Calcicole: sea cliffs and ledges (Bic; Rim.; Srl.; Cap Chat; Cld.; Prr.; Lou.; Plr.; Val.; Lbn.; For.; Pcé.); river gravels and ledges (Ann.; Ren.; Drt.; Yrk.; Gnd.; Bon.; PCa.; GCa.; Nou. (type station); Res.; Mat.); dry slaty fields (Bic); slaty beach (Bic); gravelly beach (Car.) (type station of var. *reducta*).

Boreal American: Alaska, Yukon, Mack. (Great Bear L.), James Bay, e. Que., southw. to Calif., Ariz., N. Mex., Nebr., Mo., and N.J.; also in n. Ga.; with the species, boreal circumpolar.

3. **A. divaricarpa** Nelson. [Hs] (*A. brachycarpa* (T. & G.) Britton.)

Calcicole: sea cliffs (Bic; Fla.; Marsouins; Prr.; Plr.; Mad.; Ros.); sandy coniferous swamp (New Carlisle); cliffs above lake (Lac Pleureuse); river ledges (Cap Chat); dry slaty field (Bic); calcareous gravels of spit (Pén.; Car.); beach (Mét.).

Boreal American: Alaska, Yukon, Mack. (Mack. R. Delta, Great Bear L.), Great Lakes region, e. Que., southw. to Calif., Nev., Utah, Colo., Minn., Mich., and N.Y.

3a. **A. divaricarpa,** var. **stenocarpa** Hopkins, Rhod. 39: 133. 1937.

Calcicole: sea cliffs (Bic) (type station).

Disjunct American: Sask.; e. Que.

4. **A. Drummondi** Gray. [Hs]

Calcicole: sea ledges (Bic; Cap.; Marsouins); river gravels (Ann.); alpine schists and wet shelves (Mtt.; Log.; Pem.; Bln.).

Boreal American, alpine: Alaska, Yukon, Mack. (Mack. R. Delta, Great Bear L.), Alb., Sask., N. Dak., Minn., Ont., Que., s. Lab., and Nfld., southw. to Calif., Ill., and Del.

A broad-podded form (var. *connexa* Fernald) has been collected at Bic and on the Forillon Peninsula. Rollins believes this form to represent one extreme in pod width, and that it should be included as an integral part of the species proper (*See* Rhod. 43: 373. 1941).

5. **A. Holboellii** Hornem. [Hs]

Calcicole: sea cliffs and ledges (Bic; Lbn.; For.; Pcé.); moist cliffs (Lac Matane).

Disjunct American: Alaska, Yukon, Mack. (Great Bear L.), southw. to Wash. and Alb.; e. Que.; w. and e. Greenland.

5a. **A. Holboellii,** var. **Collinsii** (Fernald) Rollins. (*A. Collinsii* Fernald in Rhod. 7: 32. 1905; *A. pendulocarpa* sensu Hopkins in Rhod. 39: 183. 1937 in part.)

Calcicole: sea cliffs and ridges (Bic).

Disjunct American: Alb. and Man., southw. to Wyo., S. Dak., and Nebr.; Lake Nipigon, Ont., and e. Que.

44. SARRACENIACEAE

(Pitcher Plant Family)

1. Sarracenia (Tourn.) L.

(Pitcher Plant)

1. **S. purpurea** L. [Hr]

Acid heath bogs (Bic; Dan.; Mar.); swampy ground (Trl.; Gnd.; Bon.; Nou.); wet depressions on alpine serpentine barrens (Alb.).

Boreal American: Mack. (Great Bear L.), n. Sask., and n. Man. to s. James Bay, Lab., and Nfld., southw. to Iowa, Ky., and Fla.

45. DROSERACEAE

(Sundew Family)

1. Drosera L.

(Sundew)

[Wynne: Drosera in Eastern North America; Bull. Torrey Bot. Club 71: 166-174. 1944.]

a. Leaf-blades suborbicular, broader than long; seeds very slender, sigmoid-fusiform, chaff-like, with a loose testa, finely striate longitudinally.
  b. Inflorescence 1-25-flowered, usually elongate; flowers white......1. *D. rotundifolia*
  b. Inflorescence 1-few-flowered, usually capitate; calyx crimson or roseate; petals greenish or crimson, sometimes foliaceous; carpels modified to green gland-bearing leaves......................................1a. *D. rotundifolia,* var. *comosa*
a. Leaf-blades linear, spatulate or cuneate, distinctly narrower than long; seeds variously ornamented.
  b. Stipules adnate to the petioles.
    c. Leaf-blades linear; seeds rhomboidal, crateriform, 0·5-0·8 mm. long..2. *D. linearis*
    c. Leaf-blades elongate-spatulate; seeds fusiform, areolate-striate, 1-1·5 mm. long..3. *D. anglica*
  b. Stipules conspicuous, free; leaves spatulate or spatulate-obovate; seeds irregularly and densely covered with long papillæ, 0·7-1 mm. long............4. *D. intermedia*

1. **D. rotundifolia** L. [Hr] Round-leaved Sundew

Swampy soil (Bic; Mtn.; Gnd.; Mar.; Car.); brackish swamp (Bnc.); alpine meadows and swamps (Alb.; Tbl.; Log.; Pem.).

Boreal circumpolar, alpine: Aleutian Is., Alaska, Yukon, Mack. (Mack. R. Delta, Great Slave L.), s. Hudson Bay, Lab., and Nfld., southw. to Calif., Nev., Mont., Minn., Pa., and Va., and in the mts. to Ala. and Fla.; s. Greenland; Iceland; Faeroes; Eurasia.

1a. **D. rotundifolia,** var. **comosa** Fernald, Rhod. 7: 9. 1905.

Marly bogs at river mouth (Gnd.) (type station).

Temperate eastern American: Gaspe; N.Y.

2. **D. linearis** Goldie. [Hr]

Marly sphagnous bog at river mouth (Gnd.).

(Boreal-)temperate eastern American: Great Lakes region, n. Me., Gaspe, Anticosti, and Nfld.

3. **D. anglica** Huds. [Hr]

Marly sphagnous bogs at river mouth (Gnd.); swampy ground (St. Léandre; Pcé.).

Boreal circumpolar: Alaska, Yukon, Mack. (Great Bear L.), James Bay, s. Lab., and Nfld., southw. to n. Calif., Nev., Great Lakes region, and Gaspe; Eurasia; Sandwich Is.

4. **D. intermedia** Hayne. [Hr] (*D. longifolia* of Gray's Man., ed. 7.)

Shore of lake (Lac Pérot, Matane co.); swampy soil (Rim.).

Boreal circumpolar: James Bay to Lab. and Nfld., southw. to La. and Fla.; West Indies; Eurasia.

46. CRASSULACEAE

(Orpine Family)

1. SEDUM (Tourn.) L.

a. Leaves very small, alternate, imbricated, ovate, very thick, entire, yellowish green; petals yellow, linear-lanceolate, 3 or 4 times as long as the ovate sepals; plant spreading on rocks, moss-like..1. *S. acre*

a. Leaves broadly oval, very fleshy, toothed, somewhat glaucous; petals purple, twice as long as the ovate acute sepals; stems stout, tufted, 3-5 dm. high..2. *S. purpureum*

1. S. ACRE L. [Ch (passive)] Goldmoss. Mossy Stonecrop

Calcareous boulders near cottages (Bic); calcareous gravels of spit (Bnc.); sandy beach (R. Blanche); dry rocks (Mét.; Mtn.; Pcé.).

Eurasian: introduced in temperate eastern N.A.; locally escaped from cultivation.

2. S. PURPUREUM Tausch. [Hp] Liveforever

Roadside (Bic; Fla.).

Eurasian: naturalized in temperate eastern N.A. and escaping from cultivation.

47. SAXIFRAGACEAE

(Saxifrage Family)

a. Fruit a dry capsule or follicle; herbs.

b. Plants with a single large white flower on a scape; carpels 3-4; capsule 1-celled; staminodia present, glandular, alternating with the stamens........1. *Parnassia*

b. Plants with several flowers; carpels 2; staminodia none.
  c. Flowers in terminal racemes or cymes; petals present; ovary in part superior; bracts not leaf-like; leaves in basal rosettes.
    d. Capsule 2-celled, 2-beaked; placentæ axial; petals entire; leaves narrow and elongated, not cordate at base.................................2. *Saxifraga*
    d. Capsule 1-celled, depressed, 2-beaked; placentæ parietal or basal; petals pinnatifid; leaves larger, cordate at base.........................3. *Mitella*
  c. Flowers very small, solitary in the axils of the leaves; petals none; ovary wholly inferior; bracts round, leaf-like; stems decumbent............4. *Chrysosplenium*

a. Fruit a berry, 1-celled; more or less spiny shrubs with palmately lobed leaves; ovary wholly inferior..5. *Ribes*

1. PARNASSIA (Tourn.) L.
(Grass of Parnassus)

a. Scapes 1·5-6 dm. high; flowers 3-4 cm. broad; petals broadly oval, many-veined, much exceeding the firm, short-oblong, scarious-margined sepals, each with 3 staminodia at base; sepals reflexed in fruit..........................1. *P. glauca*

a. Scapes 0·7-3 dm. high; flowers 8-10 mm. broad; sepals ascending in fruit.
  b. Scape 1-3 dm. high, usually bearing a clasping leaf near the middle; petals 5-9-veined, usually exceeding the sepals; capsule less than twice as long as the sepals.
    c. Basal leaf-blades cordate or rounded at base......2. *P. palustris*, var. *neogaea*
    c. Basal leaf-blades acute at base..............................3. *P. parviflora*
  b. Scape 7-15 cm. high, leafless or sometimes with a sessile leaf near the base; petals 3-veined, scarcely equalling the sepals; capsule twice as long as the sepals..4. *P. Kotzebuei*

1. **P. glauca** Raf. [Hs] (*P. caroliniana* of Gray's Man., ed. 7; *See* Wherry, Bartonia 17: 18. 1935.)

Calcicole: sea cliffs (Pcé.; Bon. I.); river ledges and gravels (Rim.; Portage; Gnd.; Pab.; Bon.; Res.; Mat.); cedar swamp (Bic).

Halophyte: salt marsh at river mouth (Bon.).

(Boreal-)temperate American: Man. to e. Que. and Nfld., southw. to Iowa, Pa., and N.J.

2. **P. palustris** L., var. **neogaea** Fernald, Rhod. 39: 311. 1937. [Hr]

Damp soil (Mét.); river mouth (Mat.).

(Arctic-)boreal American: Alaska, Yukon, Mack. (Mack. R. Delta, Great Bear L.), n. Hudson Bay, n. Lab., and Nfld., southw. to Oreg., Wyo., N. Dak., Minn., Mich., and Gaspe; with the species, arctic circumpolar.

3. **P. parviflora** DC. [Hr]

Calcicole: sea cliffs (Bic; Ann.; Trl.; Srl.; Marsouins; Mrn.; Prr.; Lou.; Clr.; For.; Anse au Griffon; Pcé.; Bon. I.); river ledges and gravels (Ann.; Cap.; Cld.; Jhn.; Gnd.; Bon.; PCa.; GCa.); wet soil (Mét.; Mtn.; Baie des Sables; R. Blanche; Trl.; Mad.; God.; Car.; Nou.); alpine cliffs above Lac des Américains (Tbl.).

Disjunct American, alpine: Alaska, Yukon, Mack. (Great Bear L.), southw. to Utah, N. Mex., Colo., and S. Dak.; James Bay and Great Lakes region to s. Lab. and Nfld., southw. to Cape Breton I.

4. **P. Kotzebuei** Cham. & Schl. [Hr] Rydberg, p. 376.

Calcicole: sea cliffs (Pcé.); river ledges (Ann.; Drt.; Jhn.; Bon.; PCa.; GCa.); wet calcareous ledges at mountain foot (Col.); alpine cliffs (Alb.; Tbl.; Log.).

Arctic American, alpine: n. coast of Alaska, Yukon, Mack. (Mack. R. Delta, Great Bear L., Coronation Gulf), s. Baffin, Hudson Str., n. Lab., and Nfld., southw. to Wyo. and Gaspe; s. Greenland; ne. Asia.

2. SAXIFRAGA L.
(Saxifrage)

a. Stem leafy.

b. Stems prostrate, tufted, densely leafy; leaves sessile, opposite, keeled, fleshy, obtuse, punctate with 1-3 pores, 2-5 mm. long, persistent, the margins ciliate; flowers purple, solitary..1. *S. oppositifolia*

b. Stems erect or ascending; leaves alternate.

c. Flowers yellow; leaves linear, entire, fleshy, distantly spinulose-ciliate, 2-18 mm. long; stems tufted, 5-15 cm. tall, several-flowered...............2. *S. aizoides*

c. Flowers white; leaves 3-7-lobed, mostly wider than long.

d. Flowers 1-5, erect, the ovate-oblong petals slightly longer than the sepals; basal leaves seldom more than 6 mm. wide, the petioles dilated at base; stems weak, 5-12 cm. long................................3. *S. rivularis*

d. Flower commonly solitary, nodding, the obovate petals 3-4 times as long as the sepals; basal leaves up to 25 mm. broad, petioled; upper leaves often bearing bulblets in their axils; stems stouter, 8-19 cm. tall.........4. *S. cernua*

a. Stems scapose, naked or bracted, glandular-pubescent, the leaves clustered at the base.

b. Leaves deeply 3-cleft, spatulate or fan-shaped, glabrous; flowering-stems linear-bracted or with several 3-lobed leaves, 5-20 cm. high, tufted, 1-8-flowered; petals white, much longer than the sepals...........................5. *S. caespitosa*

b. Leaves merely denticulate, not cleft at the apex.

c. Leaves stiff, with white denticulate cartilaginous margins, 8-24 mm. long, spatulate, thick, persistent; petals obovate, cream-colour, often spotted; plant spreading by offsets...............................6. *S. Aizoon*, var. *neogaea*

c. Leaves softer, purple beneath, obovate or oval, with narrowed or spatulate base; scapes purplish; flowers white.

d. Inflorescence spicate-racemose, in fruit 1-2·7 cm. long, 3-5-flowered, the lower bracts exceeding the flowers; sepals oblong or narrowly deltoid, reflexed in fruit, 1·8-2 mm. long, equalling or surpassing the acute or subacute petals; capsule 4 mm. long; scape 1-7 cm. high; leaves 1·5-3 cm. long, long-cuneate at base..7. *S. nivalis*, var. *tenuis*

d. Inflorescence of at length open and loosely panicled cymes, many-flowered; sepals ovate, 1·5-2 mm. long, erect in fruit, much shorter than the petals; capsule 2·5-3 mm. long; scape 8-38 cm. tall; leaves 2-15 cm. long, narrowed into a broad petiole.......................................8. *S. virginiensis*

1. **S. oppositifolia** L. [Ch (semi-shrubby) Evergreen] Mountain Saxifrage. Purple Saxifrage

Calcicole: sea cliffs (Pcé.; Bon. I.); alpine cliffs above Lac des Américains (Tbl.); alpine cliffs (Log.; Pem.).

Arctic circumpolar, alpine: Aleutian Is., n. coast of Alaska, Yukon, Mack. (Mack. R. Delta, Great Bear L., Coronation Gulf), whole of the Arctic Archipelago, Hudson Str., n. Lab., and Nfld., southw. to Gaspe, and in the mts. to Idaho, Mont., and n. Vt.; whole of Greenland; Iceland; Faeroes; Spitsbergen; arctic and alpine Eurasia.

2. **S. aizoides** L. [Ch (passive) Evergreen] Yellow Mountain Saxifrage

Calcicole: sea cliffs and talus (Prr.; Plr.; For.; Pcé.; Bon. I.); river ledges (Ann.; Lou.; Mad.; Bon.); cliffs above lake (Lac Pleureuse); alpine cliffs (Tbl.; Log.).

Arctic circumpolar, alpine: Yukon, Mack. (Great Bear L., Coronation Gulf), Victoria I., Ellesmere, Devon, Baffin, Melville, Southampton I., Hudson Str., n. Lab., and Nfld., southw. to B.C., the Great Lakes region, and Gaspe, and in the mts. to N.Y. and Vt.; whole of Greenland except northernmost part; Iceland; Spitsbergen; arctic and alpine Eurasia.

3. **S. rivularis** L. [Gb] Alpine Brook Saxifrage

Cool damp alpine slopes and rivulets (Tbl.; Log.).

Arctic circumpolar, alpine: Aleutian Is., n. coast of Alaska, Yukon, and Mack., Victoria I., Ellesmere, Devon, Bylot I., n. Baffin, Melville, n. Lab., and Nfld., southw. in the mts. to Mont. and N.H.; Greenland; Iceland; Faeroes; Spitsbergen; arctic and alpine Eurasia.

4. **S. cernua** L. [Gb] Rydberg, p. 386. Nodding Saxifrage

Cool alpine slopes (Log.).

Arctic circumpolar, alpine: n. coast of Alaska, Yukon, and Mack. (also Great Bear L.), whole of the Arctic Archipelago, n. Que., n. Lab., and Nfld., southw. in the mts. to Utah, Colo., N. Mex., and S. Dak., and Gaspe; whole of Greenland; Iceland; Spitsbergen; arctic and alpine Eurasia.

Forma *latibracteata* (Fern. & Weath.) Polunin, with bracts dilated, the lower reniform to suborbicular to broadly ovate, usually lobed, the median ovate to elliptic to obovate, is more common in our area, being found on sea cliffs (Bic; Srl.; For.), river ledges (Ann.), and alpine wet rocks (Tbl.; Log.; Mtt.; Pem.; Bln.). (*See* Fernald and Weatherby, Rhod. 33: 234. 1931; Polunin, Journ. Bot. 76: 100. 1938.)

5. **S. caespitosa** L. [Ch (cushion)] (*S. groenlandica* L.) Rydberg, p. 386. Tufted Saxifrage

Calcicole: sea cliffs and boulders (Bic; Gro.; Cap.; Ann.; Trl.; Srl.; Marsouins; Mad.; Pcé.; Bon. I.); mossy alpine rocks (Tbl.; Log.; Ftn.; Pem.).

Arctic circumpolar (essentially maritime): n. coast of Alaska, Yukon, Mack. (Mack. R. Delta, Great Bear L., Coronation Gulf), whole of the Arctic Archipelago, Hudson Str., n. Lab., and Nfld., southw. to e. Que. and in the mts. to Wash., Oreg., Utah, and Colo.; Greenland; Iceland; Faeroes; Spitsbergen; arctic and alpine Eurasia; a very polymorphic species.

Forma *brevior* Engl. & Irmsch., densely cæpitose, with flowering stems 3-8 cm. high, 1-8-flowered, has been collected from the damp talus of sea cliffs at Ruisseau Sorel.

6. **S. Aizoon** Jacq., var. **neogaea** Butters, Rhod. 46: 65. 1944. [Ch (passive) Evergreen] (*S. Aizoon* of Gray's Man., ed. 7.) Livelong Saxifrage

Calcicole: sea cliffs and boulders (Bic; Ann.; Srl.; Marsouins; Prr.; Val.; For.; Pcé.); inland cliffs (Lac Pleureuse; Tra.); alpine cliffs (Tbl.; Log.; Mtt.; Pem.; Nic.; Bln.).

Arctic American, alpine: Mack. (Great Slave L.), n. Baffin, James Bay, n. Lab., and Nfld., southw. to Sask., Lake Superior, and e. Que., and in the mts. to n. Vt.; w. and e. Greenland; Iceland; with the species, arctic circumpolar.

7. **S. nivalis** L., var. **tenuis** Wahl. [Hr] (*S. tenuis* (Wahl.) Sm.; *S. gaspensis* Fernald, Rhod. 19: 141. 1917; *See* Böcher, Meddel. om Groenl. 106: 117. 1938.)

Calcicole: sheltered pockets on calcareous cliffs above Lac des Américains (Tbl.) (type station for *S. gaspensis*); alpine schists (Tbl.; Log.; Mtt.; Ftn.; Bln.).

Arctic circumpolar (range of the species), alpine: Aleutian Is., n. coast of Alaska, Yukon, Mack. (Great Bear L.), Banks I., Melville I., Hudson Str., Ellesmere, n. and s. Baffin, n. Lab., southw. in the mts. of n. Alb. and Gaspe; Greenland except northernmost part; Iceland; Spitsbergen; arctic and alpine Eurasia.

8. **S. virginiensis** Michx. [Hrr] Early Rock Saxifrage

Calcicole: dry south-facing cliffs and ledges (Bic).

Temperate eastern American: Minn. to e. Que., southw. to Mo., Tenn., and Ga.

3. Mitella (Tourn.) L.
(Miterwort)

1. **M. nuda** L. [Hsr]

Conifer woods (Bic; Rim.; Mtn.; Pén.; Pcé.; Bon. I.; Gnd.; Irn.); subalpine woods (Bln.); swampy ground (Alb.). General in its habitat.

Boreal American: Alaska, Yukon, Mack., Hudson Bay (Churchill), s. Lab., and Nfld., southw. to Wash., Mont., Mich., and Pa.; e. Asia.

4. Chrysosplenium (Tourn.) L.
(Golden Saxifrage)

1. **C. americanum** Schwein. [Hpr]

Edge of ditch (Rim.); wet places (Mad.; Gpe.; Bon.; GCa.; Zén.); alpine rivulet above Lac des Américains (Tbl.); wet rocks (Alb.; Lyl.; Bln.); mossy subalpine meadow (Log.).

Temperate American, alpine: Sask. to e. Que., southw. to Iowa and Ga.

5. Ribes L.
(Currant. Gooseberry)

a. Flowers in clusters of 1-4; sepals broadly oblong, equalling the hypanthium; fruit purple or black, glabrous, smooth, not disarticulating from the pedicel; stems spiny at base of leaves and on the internodes. (Gooseberries.)
  b. Principal leaves cuneate to truncate at base.
    c. Mature leaves glabrate or slightly pilose beneath; calyx glabrous.................. 1. *R. hirtellum*
    c. Mature leaves densely soft-pubescent; calyx pubescent.................. 1a. *R. hirtellum*, var. *calcicola*
  b. Principal leaves cordate or subcordate at base; leaves and calyx essentially glabrous.................. 1b. *R. hirtellum*, var. *saxosum*

a. Flowers in racemes; fruit disarticulating from the pedicels. (Currants.)
  b. Leaves not resinous-dotted; hypanthium flattish.
    c. Canes, at least the younger ones, densely bristly; leaves heart-shaped, 3-5-parted, the lobes incised, pubescent along the veins beneath; racemes drooping, glandular-bristly; fruit glandular-bristly, purplish black............ 2. *R. lacustre*

c. Canes not bristly; fruit red.
  d. Ovary and berries glandular-bristly; racemes erect, slender; leaves thin, fetid, deeply cordate, smooth, 5-7-lobed, the lobes doubly serrate.......... ....3. *R. glandulosum*
  d. Ovary and berries smooth; racemes drooping in fruit.
    e. Plant weak, subprostrate; middle lobe of leaf deltoid; pedicels glandular; flowers purplish green..........................4. *R. triste,* var. *albinervium*
    e. Plant upright; middle lobe of leaf narrower, ovate; pedicels glandless; flowers yellowish green....................................5. *R. sativum*
b. Leaves resinous-dotted, at least beneath; hypanthium broadly campanulate, greenish purple and dull whitish, pubescent; fruit black...........6. *R. nigrum*

1. **R. hirtellum** Michx. [N] (*R. oxyacanthoides* of Gray's Man., ed. 7; *See* Fernald, Rhod. 7: 153-155. 1905; 13: 73-76. 1911.) Swamp Gooseberry

Slaty sea ridges (Bic); sand dunes (New Carlisle); thickets (Cap Chat); sea cliffs (Mét.; Pcé.; Dou.); inland cliffs (Tra.).

Boreal American: Mack. (Great Bear L., Great Slave L.), Hudson Bay (Churchill), Lab., and Nfld., southw. to N. Dak., Pa., and W. Va.

1a. **R. hirtellum,** var. **calcicola** Fernald. (*R. oxyacanthoides,* var. *calcicola* Fernald; *See* Rhod. 7: 153-155. 1905; 13: 73-76. 1911.)

Calcicole: sea cliffs (Bic; Trl.; Prr.; Pcé.; Mar.); river ledges (Drt.; PCa.); marly cedar swamps (Bon. (type station); Gnd.; Oie; Car.); gravels of spit (Nou.); inland cliffs (Tra.).

Boreal eastern American: n. Mich., s. James Bay, and e. Que.

1b. **R. hirtellum,** var. **saxosum** (Hook.) Fernald. (*R. oxyacanthoides,* var. *saxosum* (Hook.) Coville; *See* Rhod. 7: 153-155. 1905; 13: 73-76. 1911.)

Calcicole: sea cliffs (Bic; Trl.; Prr.; Pcé.; Bon. I.); inland cliffs (Tra.).

Range of the species.

2. **R. lacustre** (Pers.) Poir. [N] Swamp Black Currant

Woods and thickets (Bic; Fla.; Mét.; R. Blanche; Mtn.; Ann.; Trl.; Lou.; Pcé.; Gnd.; GCa.; Mat.; Irn.); subalpine woods (Alb.; Bln.). General in its habitat.

Boreal American: Alaska, Yukon, Mack. (Great Bear L.), Hudson Bay (Churchill), s. Lab., and Nfld., southw. to n. Calif., Utah, Colo., S. Dak., Mich., Pa., and N.Y.

3. **R. glandulosum** Grauer. [N] (*R. prostratum* l'Hér.) Skunk Currant

Conifer woods, chiefly on calcareous ledges (Bic; Grand Lac Matane; Ann.; Lou.; Pcé.; Bon.); subalpine woods and slopes (Alb.; Tbl.; Mtt.; Bln.). General in its habitat.

(Arctic-)boreal American: Alaska, Yukon, Mack. (?Great Bear L., Great Slave L.), James Bay, Ungava Bay, n. Lab., and Nfld., southw. to Oreg., Alb., S. Dak., Mich., and ?N.J., and along the mts. to N.C.; e. Asia.

4. **R. triste** Pall., var. **albinervium** (Michx.) Fernald. [N] Wild Red Currant

Conifer woods (Bic; Ann.; Pcé.; GCa.; Cha.; Car.; Irn.; St. Vianney); rock crevices (Bic; Pcé.); cedar swamps (New Richmond; Car.); subalpine meadows (Mtt.; Ftn.).

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Boreal American: Alaska, Yukon, Mack. (Mack. R. Delta, Great Bear L.), Hudson Bay (Churchill), s. Lab., and Nfld., southw. to Wis. and N.Y.; e. Asia.

5. R. SATIVUM (Reich.) Syme. [N] (*R. vulgare* of Gray's Man., ed. 7.) Red Currant

Crevices of calcareous ridges (Bic); woods (Rim.).

European: escaped from cultivation in temperate N.A.

6. R. NIGRUM L. [N] Black Currant

Old cellar hole (Bic); roadside (Mét.; Ann.); habitat not stated (Bon. I.).

European: escaped from cultivation in temperate N.A.

48. ROSACEAE
(Rose Family)

a. Stems armed more or less with prickles, woody; leaves pinnately compound.
b. Flowers white; fruit red, an aggregation of drupelets, separating easily from the receptacle..9. *Rubus*
b. Flowers pink (sometimes white in *R. rugosa*); fruit a fleshy hypanthium..1. *Rosa*

a. Stems not armed with prickles (thorny in *Crataegus*).
b. Plants woody.
c. Leaves simple.
d. Shrubs or small trees armed with thorns 5-7·5 cm. long; leaves incised; flowers white; fruit a pome; mature carpels very hard and bony, usually 1-ovuled..2. *Crataegus*
d. Shrubs or small trees without thorns.
e. Flowers in long or short racemes.
f. Fruit a berry-like pome with 10 incomplete cells, each cell with a seed; flowers white..3. *Amelanchier*
f. Fruit a fleshy drupe with 1 stone..............................5. *Prunus*
e. Flowers in umbels, umbel-like clusters, cymes or panicles.
f. Flowers very small and numerous, in terminal panicles; fruit a follicle; stems red or purplish brown....................................4. *Spiraea*
f. Flowers in terminal or lateral clusters; leaves mostly cuneate at base.
g. Fruit a fleshy drupe with 1 stone..............................5. *Prunus*
g. Fruit a pome.
h. Fruit small and berry-like, very dark purple; cells of the ovary as many as the styles...8. *Pyrus*
h. Fruit up to 13 mm. thick, dark purple; cells of the ovary twice as many as the styles..................................3. *Amelanchier*
e. Flowers solitary on naked peduncles; styles persistent, elongate and plumose in fruit; leaves white-canescent beneath; low depressed undershrubs, strongly caespitose, with short horizontal branches..........................6. *Dryas*
c. Leaves compound.
d. Fruit a head of many achenes..................................7. *Potentilla*
d. Fruit a pome or a cluster of drupelets.
e. Leaves pinnate, 10-16 cm. long; leaflets generally 13-17; fruit a reddish pome..8. *Pyrus*
e. Leaves simple or 3(-5)-foliolate; small semi-woody plants of a decumbent or trailing habit; drupelets many on an enlarged convex receptacle...9. *Rubus*

b. Plants herbaceous.
  c. Receptacle enlarged in fruit.
    d. Receptacle fleshy and scarlet in fruit, bearing the minute dry achenes scattered over its surface; bractlets present between the sepals; plants scapose..10. *Fragaria*
    d. Receptacle spongy in fruit, bearing many drupelets; bractlets absent between the sepals; stems leafy..9. *Rubus*
  c. Receptacle not enlarged in fruit; ovaries ripening as achenes.
    d. Fruit permanently enclosed in the persistent dry receptacle.
      e. Leaves simple, orbicular-reniform, 5-9-lobed, serrate; flowers greenish, about 4 mm. broad, very numerous in peduncled often leafy corymbs; petals none; calyx with 4 or 5 bractlets......................................11. *Alchemilla*
      e. Leaves pinnate; calyx not bracteolate.
        f. Receptacle top-shaped, ribbed, with hooked spines at the throat; petals 5, yellow; flowers in spike-like racemes........................12. *Agrimonia*
        f. Receptacle 4-angled, naked; petals none; flowers white, in dense terminal peduncled spikes; filaments long-exserted..................13. *Sanguisorba*
    d. Fruit not enclosed permanently in the receptacle; leaves compound.
      e. Calyx bracteolate, the bracts alternate with the calyx-lobes; flowers white, yellow, or purple.
        f. Styles elongated in fruit, jointed and bent near the middle, the upper part deciduous at maturity, the lower part persistent and hooked at the apex...14. *Geum*
        f. Styles not elongated in fruit.
          g. Achenes many; leaves palmately 3-7-foliolate, or pinnate..7. *Potentilla*
          g. Achenes 5-10; leaves palmately 3-foliolate, the leaflets cuneate, 3-5-toothed at the apex; flowers yellow, the petals spatulate, very small ....15. *Sibbaldia*
      e. Calyx not bracteolate; flowers white, very small and numerous, in large cymose panicles; carpels spirally twisted; leaves canescent-tomentose beneath; terminal leaflet 3-5-lobed, the lobes ovate, doubly serrate; stipules broad..16. *Filipendula*

1. Rosa (Tourn.) L.

(Rose)

a. Sepals after flowering reflexed and soon deciduous; achenes inserted only in the bottom of the usually bristly hypanthium; stem with infrastipular prickles and usually with numerous bristles on the young shoots.
  b. Hypanthium and pedicels glandular-hispid; stipules usually glandular-dentate; leaflets 7-9; stem armed with prickles.
    c. Stems 5-20 dm. high, stout, armed with stout prickles which are 8-12 mm. long, straight or slightly curved but often somewhat reflexed, flattened at base, only the young shoots bristly; stipules 1·5-3 cm. long; leaflets lance-elliptic, dark green and shining above, serrate with numerous sharp strongly ascending teeth, 2-6 cm. long; flowers corymbose, rarely solitary; hypanthium depressed-globose, 10-15 mm. broad at maturity; sepals 2-2·5 cm. long; petals 2-3 cm. long...1. *R. virginiana*
    c. Stems 1-6 dm. high, slender, densely bristly and with very slender prickles 3-5 mm. long; branches usually also copiously bristly; stipules 1-2 cm. long; leaflets rather crowded, elliptic or oblong, very thin, usually light green, shining above, sharply and finely serrate, 1-3 cm. long; flowers 1-3; hypanthium globose, about 10 mm. broad; sepals about 1·5 cm. long; petals about 2 cm. long..2. *R. nitida*
  b. Hypanthium and pedicels glabrous; stems unarmed or sparsely setose below.
    c. Stipules glandular-puberulent beneath, conspicuously glandular-ciliate, the free part semi-ovate; petiole and rhachis glandular-pulverulent and glandular-setulose; leaflets cuneate-obovate, short-pilose on both surfaces, glandular on

the nerves beneath, 1-3·5 cm. long; flowers solitary or paired; hypanthium becoming pyriform, 7-8 mm. thick; sepals more or less glandular-ciliate; petals 1·7-2 cm. long...3. *R. Williamsii*

c. Stipules glabrous except the ciliate margin, the free part lance-ovate; petiole and rhachis glabrous or sparsely pilose on the veins beneath, 1·5-5·5 cm. long; flowers solitary or corymbed; hypanthium subglobose, in fruit 10-15 mm. thick; sepals sparingly glandular; petals 2·5-3·5 cm. long............4. *R. johannensis*

a. Sepals erect after flowering (spreading in No. 5), connivent, long persistent on the fruit.

b. Stem with scattered, strongly curved, flattened prickles, rarely with intermixed bristles; leaflets sweet-scented, glandular-punctate, 1-3 cm. long, suborbicular or broadly oval, rounded at both ends or acutish at the apex, doubly serrate with gland-tipped teeth; sepals more or less lobed, glandular-hispid on the back; hypanthium pyriform or broadly ellipsoid, often with a few bristles at base, orange or scarlet...5. *R. rubiginosa*

b. Stem or at least the young shoots bristly; prickles infrastipular or lacking; foliage not sweet-scented; sepals entire or the outer sometimes with 1 or 2 lobes.

c. Stems densely bristly even in age; stipules, petioles, and rhachis in most cases glandular-granuliferous.

d. Leaflets comparatively thin, neither rugose nor strongly reticulate, usually pale and somewhat resinous-puberulent beneath, the teeth serrulate; branches and bristles glabrous.......................................6. *R. acicularis*

d. Leaflets thick, strongly reticulate, rugose; twigs, prickles, and bristles finely pubescent; twigs stout, very prickly..............................7. *R. rugosa*

c. Stems unarmed or when young slightly covered with more or less deciduous bristles.

d. Sepals erect or connivent in fruit; leaves dull and glabrous above, paler and finely pubescent, usually densely so, beneath, the oval or obovate leaflets coarsely toothed, 2-6 cm. long.

e. Stems bristly only at base...................................8. *R. blanda*

e. Stems bristly to tips or nearly so................8a. *R. blanda*, var. *hispida*

d. Sepals reflexed or spreading in fruit.

e. Leaflets decidedly puberulent or short-pilose; sepals 9-15 cm. long; petals 1·7-2 cm. long...3. *R. Williamsii*

e. Leaflets glabrous or nearly so; sepals 2-5 cm. long; petals 2·5-3·5 cm. long...4. *R. johannensis*

1. **R. virginiana** Mill. [N]

Seashore (Cha.; Newport; Anse au Gascon; St. Omer); brackish marsh at river mouths (Drt.; Bon.; PCa.); damp thickets (Res.).

(Boreal-)temperate eastern American: e. Que. to Nfld., southw. to Pa. and N.Y.

2. **R. nitida** Willd. [N] Shining Rose

Wet places (Bic; Rim.).

(Boreal-)temperate eastern American: e. Que. to Nfld., southw. to Conn.

3. **R. Williamsii** Fernald, Rhod. 20: 95: 1918. [N]

Calcicole: dry ridges (Bic (type station); Mad.; Pcé.).

Gaspe endemic.

Rosa Rousseauiorum Boivin, Naturaliste Canadien 72: 225-228. 1945, which differs from this species chiefly in its longer sepals (18-25 mm. rather than 9-15 mm.), is reported from our area (Bic; Rim.; Gnd.; Bon.).

4. **R. johannensis** Fernald. [N]

Sea ledges (Bic); river gravels (Mat.); roadside (Bic).

Temperate eastern American: e. Que., N.B., and Me.

5. R. RUBIGINOSA L. [N] (*R. Eglanteria* L.) Sweetbrier. Eglantine

Roadside (Bic); habitat not stated (New Carlisle; Pas.).

European: escaped from cultivation and naturalized throughout temperate N.A.

6. **R. acicularis** Lindl. [N] (*R. Engelmanni* Wats.)

Edge of stream (Lac Porc-Epic, Bic).

Boreal circumpolar: Alaska, Yukon, Mack. (Mack. R. Delta, Great Bear L.), James Bay, s. Lab., and Anticosti, southw. to Utah, Colo., Minn., Ill., Pa., and Mass.; Eurasia.

7. R. RUGOSA Thund. [N] Rough Rose

Psammophilous halophyte: sea beaches (Bic; Pte. au Père; Gro.).

Asiatic (native of China and Japan); escaped from cultivation in Europe and N.A.

8. **R. blanda** Ait. [N] Meadow Rose

Sea ridges and cliffs (Bic; Prr.; Lou.; Clr.; Lbn.; Pcé.; Bon. I.); river ledges and gravels (Mtn.; Drt.; Gnd.; Pab.; Bon.; PCa.; Mat.); river alluvium (Ann.; GCa.); salt marsh (Bnc.); gravel beaches (Trl.; Cha.; Pas.).

(Boreal-)temperate American: s. Mack., Hudson Bay, Nfld., southw. to Ill. and Pa.

8a. **R. blanda,** var. **hispida** Farwell, Papers Mich. Acad. Sci. 2: 25. 1923.

Sea cliffs (Prr.).

Probably the range of the species.

2. CRATAEGUS L.
(Hawthorn)

a. Anthers pale yellow; fruit 10 mm. thick.
  b. Stamens 10; nutlets 3-4, without cavities on their ventral faces; fruit bright red, lustrous, with thick, greenish yellow, dry and mealy pulp; styles 3-4; sepals coarsely glandular-denticulate; leaves rhombic to oblong-obovate, acute, attenuate at base to the stout glandular petiole; plant attaining a height of 6-7 m..1. *C. Brunetiana*
  b. Stamens 20; nutlets 4-5; fruit dark red and shining, with thin, tender, orange-coloured pulp; styles 4-5; sepals short, glandular; leaves ovate, acute, broadly cuneate at base, laciniate; petioles slender, glandular; plant 3-4 m. high.. 2. *C. irrasa*
a. Anthers pale rose, becoming purple; stamens 10; nutlets 4-5, with cavities on their ventral faces; fruit 8-10 mm. thick, deep crimson, with a thin yellow pulp, this becoming sweet and succulent; styles 3-5; sepals finely glandular-denticulate; leaves oblong-obovate, acute or acuminate; petioles often deep red after midsummer; plant attaining a height of 3-5 m.......................................3. *C. laurentiana*

1. **C. Brunetiana** Sarg. [N-M]

Calcicole: thicket (Bic); river ledges (Rim.; Gnd.).

(Boreal-)temperate eastern American: Great Lakes region to Nfld., southw. to Me.

2. **C. irrasa** Sarg. [N-M]

Calcicole: edge of lake (Lac Pleureuse).

Quebec endemic: Montreal, Trois Pistoles, Gaspe Peninsula.

3. **C. laurentiana** Sarg. [N-M]

Calcicole: cliffs above lake (Lac Pleureuse).

(Boreal-)temperate eastern American: region of Montreal; Gaspe Peninsula and Nfld.

3. AMELANCHIER Medic.
(Juneberry. Service Berry)

[Wiegand: The genus Amelanchier in eastern North America; Rhodora 14: 117-161. 1912. Wiegand: Additional notes on Amelanchier; Rhodora 22: 146-151. 1920. Nielsen: A taxonomic study of the genus Amelanchier in Minnesota; Amer. Midland Nat. 22: 160-206 (16 pl.). 1939. Jones: American species of Amelanchier; Illinois Biological Monographs 20. No. 2: 1-100 (23 pl.). 1946.]

a. Summit of the ovary densely tomentose.
  b. Flowers 1-4, fascicled in the leaf axils; mature, full-sized pomes usually only 1 or 2; leaves imbricate in the bud, glabrous from the first, firm, pale green, and slightly glaucous beneath at maturity, elliptical to suborbicular, usually acutish at each end or the base cuneate; margins finely and sharply serrate, the teeth obliquely acuminate, 6-10 per cm.............................1. *A. Bartramiana*
  b. Flowers racemose; leaves conduplicate in the bud.
    c. Mature blades oval to suborbicular, relatively thin, the apex usually rounded or subtruncate, or somewhat acutish, the base cordate or subcordate, or sometimes rounded, pale green beneath; margins dentate-serrate with broad, sharp, ascending teeth, these usually 3-6 per cm.; petals 6-9 mm. long....2. *A. gaspensis*
    c. Mature blades firm, elliptical or somewhat obovate, the apex obtuse or acute, the base rounded; margins sharply serrate, the acuminate teeth 4-10 per cm.; petals 8-11 mm. long..3. *A. Fernaldii*
    c. Mature blades firm, ovate or oval, the apex usually shortly acuminate, the base rounded or subcordate; margins finely and sharply serrate, the teeth 7-9 per cm.; petals 8-10 mm. long..4. *A. neglecta*

a. Summit of the ovary glabrous; flowers large and showy, the petals 12-22 mm. long; racemes many-flowered, flexuous, spreading or drooping; leaves ovate or oval, short-acuminate or acute at the apex, rounded or subcordate at the base; margins finely and sharply serrate, the teeth subulate, callus-tipped, 6-8 per cm.........5. *A. laevis*

1. **A. Bartramiana** (Tausch) Roemer. [N]

Cliffs and woods (Bic; Rim.; Ann.; Pcé.; Gnd.; PCa.; GCa.; Irn.); subalpine slopes (Alb.; Tbl.; Mtt.; Str.; Bln.).

Boreal eastern American: Minn., Ont., James Bay, Anticosti I., Magdalen Is., Lab., and Nfld., southw. to Pa., N.Y., and N. Eng.

2. **A. gaspensis** (Wieg.) Fern. & Weatherby. [N] (*A. sanguinea*, var. *gaspensis* Wiegand, Rhod. 14: 139. 1912; *See* Fernald and Weatherby, Rhod. 33: 235-237. 1931.)

Sea cliffs and ridges (Bic; Rim.; Fla.; Mtn.; Cap Chat; Trl.; Prr.; Plr.; Lou.; Lbn.; Pcé.; Bon. I.); inland cliffs (Tra.); river ledges and gravels (Mtn.; Ann.; Yrk.; Gnd.; Bon. (type station); PCa.; GCa.; Mat.); limestone ledges by lake (Lac Pleureuse); sandy soil (Mad.); swampy soil (Bnc.).

Boreal eastern American: n. Mich., s. Ont., James Bay, and e. Que.

3. **A. Fernaldii** Wiegand, Rhod. 22: 149. 1920 [N]

Sea cliffs and ridges (Bic; Plr.; Lou.; Lbn.; Pcé.); river ledges (Rim.; Gnd.); swampy soil (Mar.).

Gulf endemic: e. Que., Anticosti I., P.E.I., Magdalen Is., w. Nfld.

4. **A. neglecta** Egglest. [N]

Various stations in Gaspe (*See* Map 2, p. 26, of Jones' monograph).

Temperate eastern American: e. Que., Magdalen Is., and Cape Breton I., southw. to N. Eng. and N.Y.

5. **A. laevis** Wiegand, Rhod. 14: 154. 1912. [N-M]

Sea ridges (Bic; Rim.); rich alluvial woods (Cap Chat); thickets (Ann.; Drt.; GCa.; Car.; Nou.).

(Boreal-)temperate eastern American: Minn. to e. Que. and Nfld., southw. to Mo., Ind., and Ga.

4. SPIRAEA (Tourn.) L.

(Meadow-sweet)

a. Primary inflorescence pyramidal-paniculate, the lower branches of the panicle distinctly elongate..1. *S. latifolia*

a. Primary inflorescence cylindric to subcylindric, the lower branches scarcely if at all exceeding the subtending leafy bracts............1a. *S. latifolia*, var. *septentrionalis*

1. **S. latifolia** (Ait.) Borkh. [N] (*See* Fernald, Rhod. 19: 255. 1917.)

Edge of stream (Bic); fields (Rim.; Newport).

(Boreal-)temperate American: Sask. to Côte Nord and Nfld., southw. to Va.

1a. **S. latifolia,** var. **septentrionalis** Fernald, Rhod. 19: 255. 1917.

Fields near the sea (Newport).

(Boreal-)temperate eastern American, alpine: e. Que. and Côte Nord to Nfld., southw. in the mts. to Me. and N.H.

5. PRUNUS (Tourn.) L.

[Groh and Senn: Prunus in Eastern Canada; Can. Journ. Res. 18, sec. C: 318-346. 1940.]

a. Flowers in racemes, terminating the leafy branches of the season, numerous; fruit red, turning to dark crimson, astringent; leaves broad-elliptic to obovate, broad-cuneate to rounded at base, closely serrulate; bracts small............1. *P. virginiana*

a. Flowers in simple umbel-like clusters; bracts conspicuous.

  b. Prostrate shrubs; buds 3 in each leaf axil; pedicels usually short; fruit dark claret-colour, about 1 cm. in diameter; leaves oblanceolate-spatulate, subentire at the cuneate base..................................2. *P. pumila*, var. *depressa*

  b. Small trees; buds solitary; pedicels long; fruit light red, 7-8 mm. in diameter, with thin and sour flesh; leaves oblong-lanceolate, acuminate, finely and sharply serrate with incurved teeth...................................3. *P. pensylvanica*

1. **P. virginiana** L. [M] Choke Cherry

Hillside thickets (Bic; Rim.; Mét.; Prr.; Lou.; Dou.); subalpine slopes (Log.; Mtt.; Ftn.; Col.; Lac Mont Louis). General.

Boreal American: S. Dak. to s. James Bay and Nfld., southw. to Tex. and Fla.

2. **P. pumila** L., var. **depressa** (Pursh) Bean. [Ch (passive)] (*P. pumila* of Gray's Man., ed. 7; *P. depressa* Pursh; *See* Fernald, Rhod. 25: 69-74. 1923.) Sand Cherry

Calcicole: sea cliffs (Prr.); river gravels (Jhn.; Gnd.; Bon.; Mat.; Res.).

Temperate eastern American: Great Lakes region to e. Que. and Anticosti, southw. to s. N.B.

3. **P. pensylvanica** L. f. [M] Pin Cherry. Wild Red Cherry

Rocky woods (Bic; Rim.; Mét.; Mtn.; Prr.; Gpe.; Irn.; Bln.). General.

Boreal American: s. Mack. and n. Alb. to Lab. and Nfld., southw. to Iowa and Pa., and in the mts. to Colo. and N.C.

6. Dryas L.

(Dryad. Mountain Avens)

[A. E. Porsild: The genus Dryas in North America; Can. Field-Nat. 61: 175-192. 1947.]

a. Petals yellow, erect; sepals ovate; leaves elliptic or obovate, acute at the base, rounded at apex, coarsely crenate............................1. *D. Drummondii*

a. Petals white, spreading; sepals linear or linear-lanceolate; leaves ovate or ovate-lanceolate, subcordate at base, acutish at apex, with entire, revolute margins..2. *D. integrifolia*

1. **D. Drummondii** Richards. [Ch (semi-shrubby) Evergreen] Rydberg, p. 430. Yellow Dryad

Calcicole: sea cliffs (Lbn.); river gravels (Mtn.; Ann.; Drt.; Jhn.; Portage; Gnd.; Bon.; PCa.).

Disjunct American (alpine): Alaska, Yukon, Mack. (Great Bear L.) to B.C., southw. in the mts. to Oreg. and Mont.; Great Lakes region; Gaspe Peninsula, Anticosti, and s. Lab.

2. **D. integrifolia** Vahl. [Ch (semi-shrubby)] Rydberg, p. 430. White Dryad

Calcicole: summit of Mt. Ste. Anne (Pcé.); alpine cliffs above Lac des Américains (Tbl.); talus of alpine schists (Log.).

Arctic American, alpine: n. coast of Alaska, Yukon, and Mack., Herschel I., Banks I., Victoria I., King William I., Somerset I., Devon, Bylot I., n. Melville, Baffin, n. Lab., and Nfld., southw. to B.C. and Gaspe, and mts. of Alb., Mont., and N.H.; n. Greenland; e. Asia (Siberia).

7. Potentilla L.

(Cinquefoil)

a. Flowers purple; style lateral; achenes glabrous; receptacle hairy, becoming large and spongy; leaves pinnate, with 5-7 more or less approximate serrate leaflets, green above, paler and purple-veined beneath; stems stout, from a decumbent rooting base; aquatic plants.

b. Stems more or less hirsute with spreading hairs, somewhat glandular above; leaflets sparingly hairy, glabrate in age..................................1. *P. palustris*

b. Stems, petioles, peduncles, bractlets, etc., densely glandular-villous; leaflets densely velvety on both sides when young....................1a. *P. palustris*, var. *villosa*

a. Flowers yellow or white.

b. Small bushy shrubs; styles lateral; achenes hairy; petals yellow, orbicular; leaves pinnate, with 5-7 crowded, entire, silky, revolute-margined leaflets; bark shreddy in age...2. *P. fruticosa*

b. Herbs (or *P. tridentata* woody but not bushy).

c. Flowers solitary, yellow; styles lateral; leaves basal.

d. Achenes corky with a deep groove; leaflets silvery-silky beneath, at least the younger lustrous...3. *P. Anserina*

d. Achenes not corky, without a groove, laterally compressed; leaflets white-tomentose beneath with opaque hairs............4. *P. Egedii*, var. *groenlandica*

c. Flowers cymose.

d. Leaves pinnate; achenes glabrous.

e. Flowers white or cream-colour; style nearly basal; cyme strict and rather close; leaflets 7-11, cut-serrate, downy beneath; stem glandular-viscid, brownish-hairy..5. *P. arguta*

e. Flowers yellow; style terminal; leaves with 5 approximate leaflets, the lower pair the smallest, greyish-tomentose and veiny beneath, nearly glabrous above, divided to near the midrib into linear-oblong obtuse divisions; stems decumbent or ascending, silky-strigose......................6. *P. pectinata*

d. Leaves palmate.

e. Flowers white; style lateral; achenes hairy; leaflets 3, wedge-oblong, thick, coarsely 3-toothed at the apex, nearly smooth..............7. *P. tridentata*

e. Flowers yellow; styles terminal; leaves toothed on the sides.

f. Cymes very leafy and many-flowered.

g. Leaflets 5, wedge-oblong, deeply cleft, with revolute margins, green above, silvery-white beneath; calyx white-tomentose; styles filiform but short, not glandular...................................8. *P. argentea*

g. Leaflets 3, obovate to oblanceolate, not white-tomentose; calyx large, not white-tomentose; styles fusiform, glandular at base.

h. Plant bristly-villous.................................9. *P. norvegica*

h. Stems glabrous or sparingly silky-villous; leaves smoothish.......... ....9a. *P. norvegica*, var. *labradorica*

f. Cymes few-leaved and few-flowered.

g. Leaves densely white-tomentose beneath; plants densely tufted.

Leaflets greyish-silky above..............................10. *P. nivea*

Leaflets dark green above................10a. *P. nivea*, var. *macrophylla*

g. Leaves not tomentose; stem-leaves few, reduced; stems 2-10 cm. high, decumbent..............................11. *P. hyparctica*, var. *elatior*

1. **P. palustris** (L.) Scop. [Hel] (*Comarum palustre* L.) Marsh Cinquefoil

Swampy soil and pond edges (Bic; Cld.; Yrk.; Dou.; Dan.; Bon.; Nou.; Zén.); subalpine swamp and pond edges (Tbl.). General in its habitat.

(Arctic-)boreal circumpolar: Aleutian Is., Alaska, Yukon, Mack. (Mack. R. Delta, Great Bear L.), n. Hudson Bay, n. Lab., and Nfld., southw. to Calif., Wyo., Iowa, Ill., Ind., Ohio, Pa., and N.J.; sw. and se. Greenland; Iceland; Faeroes; arctic and alpine Eurasia.

1a. **P. palustris**, var. **villosa** (Pers.) Lehm. (*See* Fernald and Long, Rhod. 16: 5-11. 1914.)

Brackish swamp (Bnc.).

Essentially the range of the species.

2. **P. fruticosa** L. [N] Shrubby Cinquefoil

Calcicole: crests of Mt. Ste. Anne (Pcé); cliffs above lake (Lac Pleureuse); inland cliffs (Tra.); river ledges and gravels (Ann.; Lou.; Mad.;

Drt.; Jhn.; Gnd.; Pab.; Bon.; Nou.; Mat.); lake shore (Lac à Claude); sea cliffs (Prr.); alpine slopes (Log.; Pem.; Ftn.); edge of Lac des Américains (Tbl.).

Alpine serpentine barrens (Alb.); gravel flats below Mt. Albert (R. du Diable).

Arctic circumpolar, alpine: n. coast of Alaska, Yukon, Mack. (Mack. R. Delta, Great Bear L., Coronation Gulf), Hudson Bay (Churchill), s. Lab., and Nfld., southw. to Calif., Ariz., N. Mex., Iowa, Ill., Pa., and N.J.; Greenland; arctic and alpine Eurasia.

3. **P. Anserina L.** [Hrr] Silverweed

Calcicole: sea ridges (Bic); river gravels (Drt.; Res.; Mat.); slaty sea beaches (Bic; Rim.; Mét.; R. Blanche; Pén.; Pas.); sandy shore (Lac au Saumon).

Boreal circumpolar: Alaska, Yukon, Mack. (Great Slave L.), Hudson Bay (Churchill), Côte Nord, and Nfld., southw. to Calif. and n. N.J.; s. Greenland; Iceland; Faeroes; Eurasia.

Forma *sericea* (Hayne) Fernald, with leaflets silvery-silky on both surfaces, has been collected from sandy beaches at Bic and Paspébiac (*See* Rhod. 11: 8. 1908; 35: 273. 1933).

4. **P. Egedii** Wormsk., var. **groenlandica** (Tratt.) Polunin. [Hrr] (*P. pacifica* Howell; *See* Fernald, Rhod. 11: 1-9. 1909; Polunin, Rhod. 41: 40. 1939.)

Halophyte: salt marshes (Bic; Baie des Sables).

Psammophilous halophyte: wet hollows in sand dunes (Pén.).

(Arctic-)boreal American (essentially maritime): Aleutian Is., Alaska, Hudson Bay (Churchill), n. Lab., and Nfld., southw. to s. Calif., Conn., and N.Y.; w. and s. Greenland; Iceland; e. Asia.

5. **P. arguta** Pursh. [Hs]

Calcicole: sea cliffs (Pcé.); dry south-facing cliffs at the foot of Bic Mt. (Bic); dry slaty field (Lou.); river ledges and gravels (Rim.; Gnd.; Res.; Mat.).

Boreal American: Alaska, Yukon, Mack., Ont., e. Que., southw. to Colo., Kans., Ill., and Va.

6. **P. pectinata** Raf. [Hs] Coast Cinquefoil

Calcicole: sea cliffs, ridges and boulders (Bic; Trl.; Prr.; Plr.; Ros.; For.; Pcé.); slaty fields (Baie des Sables).

Psammophilous halophyte: sea beaches and boulders within reach of salt spray (Bic; Mét.; R. Blanche; Gro.; Ann.; Srl.; Marsouins; Lou.; Mal.; Car.).

Boreal American (maritime): Yukon, Mack. (n. coast and Great Slave L.), Hudson Bay (Churchill, Cape Jones), Lab., and Nfld., southw. to Me. and N.H.

7. **P. tridentata** Soland. [Ch (semi-shrubby)] Three-toothed Cinquefoil

Sea cliffs (Bic; For.; Gpe.; Pcé.; Bon. I.; Tra.); calcareous gravels of spits (Pén.; Car.; Pas.); dry fields (Bic; Mét.; R. Blanche; Gnd.); alpine cliffs (Alb.; Tbl.; Bln.).

(Arctic-)boreal American: n. Alb., n. Sask., Hudson Bay (Churchill), Ungava Bay, ?s. Baffin, Lab., and Nfld., southw. to the Great Lakes region and N.J., and in the mts. to Ga.; w. and e. Greenland.

Forma *hirsutifolia* Pease, with both surfaces of the leaflets rather abundantly hirsute, has been collected from the calcareous gravels of the spit at Paspébiac.

Forma *aurora* Graustein, with pinkish flowers, has been collected at Bic.

8. **P. argentea** L. [Hsr] Silvery Cinquefoil

Fields and roadsides (Bic); sand (New Carlisle).

(Boreal-)temperate circumpolar: N. Dak. to e. Que. and Nfld., southw. to Kans., Ind., and D.C.; Eurasia.

9. **P. norvegica** L. [Hs] Rough Cinquefoil

Calcicole: sea cliffs (Srl.; For.; Pcé.); river gravels (Mat.); roadside (Mad.); field near pond (Bic); alpine schists (Log.).

Boreal circumpolar: Alaska, Yukon, Mack. (Great Bear L., Great Slave L.), s. Hudson Bay, Lab., and Nfld., southw. to Calif., Kans., Mo., Tenn., and S.C.; Greenland (introduced); Iceland; Eurasia.

9a. **P. norvegica,** var. **labradorica** (Lehm.) Fernald. (*P. monspeliensis,* var. *labradorica* (Lehm.) Fernald; *See* Rhod. 28: 213. 1926.)

Roadside (Bic); sea cliffs (Srl.; Marsouins); gravelly beach (Pas.); alpine schists (Log.; Pem.; Bln.).

Boreal eastern American, alpine: e. Que. to Lab. and Nfld., southw. in the mts. to N.H.

10. **P. nivea** L. [Ch (semi-shrubby)] Rydberg, p. 417. Snowy Cinquefoil

Calcicole: sea cliffs (Bic; Srl.; Lbn.; For.; Pcé.); alpine cliffs (Alb.; Tbl.; Mtt.; Log.; Pem.; Ftn.; Bln.).

Arctic circumpolar, alpine: Alaska, Yukon, Mack. (Mack. R. Delta, Great Bear L., Coronation Gulf), Victoria I., Hudson Str., s. Baffin, n. Lab., and Nfld., southw. to B.C. and e. Que.; w. and e. Greenland; Spitsbergen; arctic and alpine Eurasia.

10a. **P. nivea,** var. **macrophylla** Ser.

Calcicole: sea cliffs (Bic; Srl.; Pcé.); alpine schists (Tbl.; Log.; Mtt.).
Essentially the range of the species.

11. **P. hyparctica** Malte, var. **elatior** (Abromeit) Fernald. [Ch (semi-shrubby)] (*P. emarginata* Pursh; *P. fragiformis* of authors; *See* Malte, Rhod. 36: 177. 1934; Fernald, Rhod. 45: 111-112. 1943.)

Alpine cliffs (Log.; Mtt.; Bln.).

Arctic circumpolar, alpine: Bering I., n. coast of Alaska, Yukon, Mack. (Coronation Gulf), Banks I., Melville I., Bathurst I., Ellef Ringness I., Ellesmere, Devon, n. and s. Baffin, Hudson Str., n. Lab., southw. in the mts. to B.C. and Gaspe; w. and e. Greenland; Spitsbergen; e. Asia (Siberia).

8. PYRUS (Tourn.) L.

[Jones: A synopsis of the North American species of Sorbus; Journ. Arnold Arb. 20: 1-43. 1939. Fernald: Minor transfers in Pyrus; Rhodora 49: 229-233. 1947.]

a. Leaves simple, the midrib glandular along the upper side; styles united at the base; fruit very dark purple or almost black......................1. *P. melanocarpa*

a. Leaves odd-pinnate with 11-17 leaflets; styles distinct.

b. Leaflets lanceolate to narrowly oblong-lanceolate, acuminate, 3½-5 times as long as wide, finely serrate nearly to the base with lanceolate, acuminate, incurved teeth, the upper surface bright green; flowers 4-6 mm. broad; fruits 4-6 mm. thick..2. *P. americana*

b. Terminal leaflet often obovate; lateral leaflets elliptical or oblong, acute or abruptly short-acuminate, asymmetrical at base, 2-3 times as long as wide, the lowermost pair usually smaller, coarsely serrate to the middle or below, the teeth ovate, abruptly mucronate, 3-4 per cm., the upper surface dull, dark green; flowers 7-10 mm. broad; fruits 7-10 mm. thick at maturity.

c. Inflorescence 8-15 cm. broad; flowers about 1 cm. across; sepals triangular, 1 mm. long; petals broadly oval, 4 mm. long, somewhat truncate or slightly tapering at the base; fruit subglobose, 8-10 mm. thick; small tree or shrub 6-12 m. tall..3. *P. decora*

c. Inflorescence 5-10 cm. broad; flowers 5-8 mm. broad; sepals triangular, 1·5-2 mm. long; petals orbicular, 3-4 mm. long, truncate at base; fruit ellipsoid or subglobose, 5-7 mm. long, 5 mm. thick...........3a. *P. decora*, var. *groenlandica*.

1. **P. melanocarpa** (Michx.) Willd. [N] (*Aronia melanocarpa* (Michx.) Elliott.) Black Chokeberry

Heath bog (Mal.).

(Boreal-)temperate eastern American: Mich. to e. Que. and Nfld., southw. to Fla.

2. **P. americana** (Marsh.) DC. [M] (*Sorbus americana* Marsh.) American Mountain-ash. Roundwood

Woods (Drt.; Gpe.; Canton Pinault).

(Boreal-)temperate eastern American: Minn. to Côte Nord and Nfld., southw. to Tenn. and N.C.

3. **P. decora** (Sarg.) Hyland. [M] (*Sorbus decora* (Sarg.) Schneider.)

Rocky woods (Bic; Rim.; Mét.; Prr.; Yrk.; Pcé.); subalpine woods (Alb.; Str.; Bln.).

(Boreal-)temperate eastern American: Minn., James Bay, e. Que. and Nfld., southw. to Iowa and N.J.; s. Greenland.

3a. **P. decora,** var. **groenlandica** (Schneid.) Fernald. (*S. decora*, var. *groenlandica* (Schneid.) Jones, Journ. Arnold Arb. 20: 30. 1939.)

Alpine schists and alluvia of alpine brooks (Alb.; Str.).

Boreal eastern American: e. Que. and s. Lab.; s. Greenland.

9. Rubus (Tourn.) L.

(Raspberry. Bramble)

[Bailey: The genus Rubus in North America; Gentes Herbarum 5: 1-918. 1941-1945.]

a. Plants habitually unarmed; leaves simple or 3(-5)-foliolate; stems low, essentially herbaceous and weak.

b. Leaves simple, roundish-reniform, somewhat 5-lobed, serrate, wrinkled; flowers white, dioecious, solitary on erect short shoots bearing 1-3 leaves; fruit becoming yellow or orange..1. *R. Chamaemorus*

b. Leaves 3(-5)-foliolate; shoots sometimes prostrate or running.

c. Inflorescence glandular............................5a. *R. strigosus*, var. *tonsus*

c. Glands absent.
  d. Stems erect or tufted, not permanent; plants not producing runners; leaflets usually 4 cm. or less long, usually blunt at apex, cuneate at base, somewhat firm, glossy above, coarsely serrate-dentate; flowers large, commonly solitary, the petals rose-colour; fruit red....................................2. *R. acaulis*
  d. Stems prostrate or running and rooting, often semi-ligneous; leaflets 4-6 cm. long, acute.
    e. Corolla rose-colour, often 2 cm. across at expansion, the petals spreading at maturity; leaflets coarsely and commonly acutely toothed, not long-narrowed to base; fruit black or blackish..................3. *R. paracaulis*
    e. Corolla white (sometimes changing to pinkish), much smaller, the petals erect; leaflets acutely toothed or serrate, the terminal one long-narrowed to base; fruit red; plant long-running for the most part......4. *R. pubescens*

a. Plants armed with prickles; leaves 3-5-foliolate.
  b. Inflorescence bearing glands, these also sometimes present on other parts; leaves greyish-pubescent beneath.......................................5. *R. strigosus*
  b. Plants glandless; leaves glabrous or lightly pubescent beneath.
    c. Primocanes bearing many straight, bristle-like, weak prickles 2-4 mm. long; leaflets slenderly acuminate to almost caudate at apex; calyx-lobes pilose-pubescent, ovate, with caudate extension but shorter than the petals...6. *R. Kennedyanus*
    c. Primocanes unarmed or with a few weak pricklets; pricklets present on midrib of primocane leaves, the latter with a long narrow tail-like end; calyx-lobes puberulent, projected into very long narrow ends that may equal the petals in length...7. *R. Lepagei*

1. **R. Chamaemorus** L. [Hp] Bakeapple. Cloudberry

Acid heath bogs (Bic; Pte. au Père; Mtn.; Mal.; Dan.; Sayabec); alpine heath bogs (Alb.; Tbl.; Log.; Ftn.).

Arctic circumpolar, alpine: Aleutian Is., n. coast of Alaska, Yukon, Mack. (Mack. R. Delta, Great Bear L.), King William I., Southampton I., s. Baffin, n. Lab., and Nfld., southw. to B.C. and N.Y., and the mts. of N.H.; w. Greenland; Spitsbergen; arctic Eurasia.

2. **R. acaulis** Michx. [Hpr] (*R. arcticus* of Gray's Man., ed. 7, not L.; *R. castoreus* of authors.)

Woods (Rim.); marly bog at river mouth (Gnd.); alpine slopes (Alb.; Log.; Bln.); calcareous alpine meadow (Tbl.). The latter collection was identified as *R. arcticus* by Fernald, but Bailey was unable to recognize the Eurasian plant in the western hemisphere. Porsild, however (Rhod. 41: 245. 1939), has "with some doubt" referred an Alaskan plant to this species.

Boreal American, alpine: Alaska, Yukon, Mack. (Mack. R. Delta, Great Bear L.), Hudson Bay (Churchill), Lab., and Nfld., southw. to B.C., Alb., Sask., Man., n. Minn., Ont., and Gaspe.

3. **R. paracaulis** Bailey, Gentes Herbarum 5: 33. 1941. [Hpr]

Marly bog at river mouth (Gnd.).

Boreal American: n. Sask. and Man. (Churchill), s. Lab., southw. to s. Alb., central Sask., s. Man., James Bay, and Gaspe.

4. **R. pubescens** Raf. [Hpr] (*R. triflorus* Richards.)

Edge of marly pond (Lac Porc-Epic, Bic); sea ridges (Bic); river ledges and gravels (Cld.; Jhn.; Gnd.; Bon.); calcareous alpine meadow (Tbl.); alpine slopes (Alb.; Mtt.; Lyl.).

Boreal American: Alaska, Yukon, Mack. (Mack. R. Delta), Hudson Bay (Churchill), Lab., and Nfld., southw. to Nebr. and n. N.J.

5. **R. strigosus** Michx. [Hp] (*R. idaeus,* var. *strigosus* Maxim.; *R. idaeus,* var. *aculeatissimus* of Gray's Man., ed. 7; *R. idaeus,* var. *canadensis* Richardson.) American Red Raspberry

Slaty fields (Bic); clay banks (Fla.); talus of sea cliffs (Trl.; Prr.); thickets (Mét.; Ann.; Trl.; Lou.; Pcé.; Pas.; St. Tharsicius); alpine schists (Alb.; Bln.); subalpine meadow (Log.).

Boreal American: Alaska, Yukon, Mack., James Bay, Lab., and s. Nfld., southw. to Calif., Ariz., N. Mex., Tenn., and N.C.; *R. idaeus* is the commonly cultivated glandless Eurasian plant.

5a. **R. strigosus,** var. **tonsus** (Fernald) Bailey. (*R. idaeus,* forma *tonsus* Fernald, Rhod. 21: 96. 1919.)

Thickets (Rim.); timber-line (Alb.).

Temperate eastern American: e. Que., ne. Pa., and N.Eng.

6. **R. Kennedyanus** Fernald, Rhod. 33: 208. 1931 [Hp]

Edge of river (Rim.).

Gulf endemic: e. Que. and Nfld.

7. **R. Lepagei** Bailey, Gentes Herbarum 5: 482-483. 1944. [Hp]

Rich woods by river (Rim.).

Local endemic.

10. FRAGARIA (Tourn.) L.
(Strawberry)

- a. Pubescence of scapes and petioles generally spreading at right angles or somewhat reflexed (scanty and less spreading in No. 1a.); leaflets 2-10 cm. long.
  - b. Leaflets subsessile, coarsely serrate, rhombic-obovate, acute; achenes superficial; calyx reflexed in fruit; primary branches of cyme distinctly unequal.
    - c. Fruit hemispheric; scapes and petioles distinctly pubescent with spreading hairs .... 1. *F. vesca*
    - c. Fruit ovoid or subconic, usually with a distinct neck; scapes and petioles sparingly hairy, the hairs more ascending or appressed .... 1a. *F. vesca,* var. *americana*
  - b. Leaflets petiolulate, shallowly toothed, obovate or oblong, obtuse; achenes set in deep pits; pedicels with appressed hairs; primary branches of cyme subequal .... 2. *F. virginiana*
- a. Pubescence of the scapes and petioles appressed-ascending (No. 2 may be looked for here); achenes in pits.
  - b. Leaflets sessile, 1-2·5 cm. long, the terminal one cuneate-obovate, entire below the rounded or subtruncate, coarsely serrate apex; petals about 5 mm. long; rootstock short and caespitose, very rarely stoloniferous........ 3. *F. multicipita*
  - b. Leaflets short-stalked, 2-5 cm. long, the terminal one obovate, serrate; petals 7-10 mm. long; rootstock short; runners few and slender........ 2a. *F. virginiana,* var. *terrae-novae*

1. F. VESCA L. [Hrr]

Sea cliffs (Bic).

Eurasian: naturalized in eastern N.A. from Ohio to Nfld., southw. to Ky. and Pa.; Iceland.

1a. **F. vesca,** var. **americana** Porter.

Slaty sea ledges (Bic); sea cliffs (Prr.; Plr.; Mad.; Lbn.); river gravels (Ann.; Cld.; Gnd.; Bon.; GCa.; Mat.); rocky woods (Mtn.; Nou.); seashore (Anse Jersey).

Boreal American: Mack. and Man. to Nfld., southw. to N. Mex. and Va.

2. **F. virginiana** Duchesne. [Hrr] Field Strawberry

Sea ridges (Bic); river gravels (Drt.); dry open conifer woods (Bic).

Boreal American: S. Dak. to s. James Bay, Mingan Is., and Nfld., southw. to Okla. and Fla.

2a. **F. virginiana,** var. **terrae-novae** (Rydb.) Fernald. (*F. terrae-novae* Rydb.)

Sea cliffs (Bic; Pcé.); river gravels (Ann.; Drt.; Gnd.); fields (Lou.; Clr.); subalpine meadows and lake shores (Alb.; Tbl.; Log.; Mtt.; Pem.; Col.).

Boreal eastern American: Ont. and s. James Bay to s. Lab. and Nfld., southw. to Mass.

3. **F. multicipita** Fernald, Rhod. 10: 49. 1908. [Hr]

Calcicole: river gravels (Ann.) (type station).

Local endemic.

11. ALCHEMILLA L.

(Lady's Mantle. Dew-cup)

a. Pubescence of stems and petioles spreading; leaves hairy above...1. *A. vulgaris,* var. *filicaulis*

a. Pubescence of stems and petioles appressed, sometimes very sparse; upper surface of leaves glabrous except rarely on the veins; veins below hairy only near the apex ....1a. *A. vulgaris,* var. *grandis*

1. **A. vulgaris** L., var. **filicaulis** (Buser) Fern. & Wieg.; *See* Rhod. 14: 232. 1912. [Hs] (*A. filicaulis* Buser.)

Rich woods (Mat.).

Amphi-Atlantic: e. Que., Lab., and Nfld.; Greenland; w. Europe.

1a. **A. vulgaris,** var. **grandis** Blytt. (*A. alpestris* Schmidt.)

Beach near lighthouse (Mét.).

Amphi-Atlantic: e. Que., Lab., and Nfld.; Europe.

12. AGRIMONIA (Tourn.) L.

(Agrimony)

a. Rhachis of inflorescence covered with minute glandular puberulence interspersed with long wide-spreading hairs; leaves sparingly pubescent beneath; hooks of the fruiting calyx long, wide-spreading, the outer ones deflexed.................1. *A. gryposepala*

a. Rhachis appressed-villous or glandular-puberulent, without long hairs; lower surface of leaflets conspicuously resinous-dotted, only the veins villous; hooks relatively short, connivent or scarcely spreading.......................................2. *A striata*

1. **A. gryposepala** Wallr. [Hpr]

Thicket on island at river mouth (Mat.); roadside thickets (Bic; Rim.; Drt.).

Temperate American: Minn. to e. Que., southw. to Mo., Tenn., and N.C.

2. **A. striata** Michx. [Hpr]

Woods (Bic; Cap Chat; Lou.; Bon. I.; Drt.; R. Ouest; Bon.; GCa.).

(Boreal-)temperate circumpolar: Sask. to Nfld., southw. to N. Mex., Ill., and Va.; Eurasia.

13. SANGUISORBA (Rupp.) L.

(Burnet)

1. **S. canadensis** L. [Hs] Canada Burnet

Wet meadows and roadsides (Bic; Rim.; Mét.; Tng.; Drt.; Bnc.; Pcé.; Gnd.; Dan.; PCa.) (specimens from the last station originally distributed as the western American var. *latifolia* Hooker).

Boreal American: Man. to Lab. and Nfld., southw. to Mich. and Va., and in the mts. to Ga.

14. GEUM L.

(Avens)

a. Upper joint of the style plumose; calyx purplish, erect or spreading; petals erect.

  b. Petals purplish orange, dilated-obovate, retuse, contracted into a claw; calyx-lobes in anthesis 6-10 mm. long; stem pubescent........................1. *G. rivale*

  b. Petals clear golden yellow, obovate, less contracted at base; calyx-lobes in anthesis 4-5 mm. long; stem hirsute, glandular-puberulent above........2. × *G. pulchrum*

a. Upper joint of the style hairy, deciduous, the lower part naked and hooked, becoming elongated; calyx green, with reflexed lobes.

  b. Petals white or cream-white, small, spatulate or oblong; stipules small.

    c. Petals white, equalling the sepals; receptacle of fruit densely bristly; achenes bristly; plant slender, sparingly soft-hairy.....................3. *G. canadense*

    c. Petals cream-white, shorter than the sepals; receptacle glabrous or nearly so; achenes glabrous; plant stout, bristly-hairy.....................4. *G. laciniatum*

  b. Petals golden yellow, broadly obovate, exceeding the sepals; stipules broad, foliaceous, deeply cut.

    c. Terminal segment of leaves suborbicular, finely crenate-dentate; receptacle nearly glabrous...5. *G. macrophyllum*

    c. Terminal segments of leaves cuneate-obovate, incisely toothed; receptacle downy...6. *G. aleppicum, var. strictum*

1. **G. rivale** L. [Hs] Purple Avens. Water Avens

Wet meadows and swampy soil (Bic; Rim.; Mét.; Trl.; Yrk.; Pcé.; Gnd.); alpine meadows (Alb.; Tbl.; Log.). General in its habitat.

Boreal circumpolar, alpine: Sask. to James Bay, Lab., and Nfld., southw. to Colo., Ind., Pa., and n. N.J.; Iceland; Faeroes; Eurasia.

2. × **G. pulchrum** Fernald, Rhod. 8: 11. 1906 [Hs] (*G. macrophyllum* × *rivale* Fernald.)

Boggy meadows (Bic) (type station).

Disjunct American: Alb. and Sask. (*See* N. Am. Fl. 22: 407. 1913); e. Que. and Vt.

3. **G. canadense** Jacq. [Hs] White Avens

Woods (Mat.).

Temperate American: S. Dak. to e. Que., southw. to Kans. and Ga.

Forma *glandulosum* Fern. & Weath., with outer surface of sepals and the peduncles more or less densely beset with articulate gland-tipped trichomes (Rhod. 24: 48. 1922), is the plant represented in the above collection.

4. **G. laciniatum** Murr. [Hs] (*G. virginianum* L., var. *Murrayanum* Fernald; *See* Rhod. 25: 98-99. 1923; 37: 293. 1935.)

Alluvial woods (R. Cap Chat).

Temperate eastern American: Que. to N.S., southw. to Ind. and Mass.

5. **G. macrophyllum** Willd. [Hs] Large-leaved Avens

Thickets (Bic; Rim.; Drt.; Gpe.; Pcé.; GCa.); alluvium of alpine brook (Alb.); subalpine meadows and woods (Tbl.; Log.).

Boreal American: Aleutian Is. and Alaska to s. James Bay, Lab., and Nfld., southw. to Calif. and N.H.; e. Asia.

6. **G. aleppicum** Jacq., var. **strictum** (Ait.) Fernald. [Hs] (*G. strictum* Ait.; *See* Rhod. 37: 294. 1935.) Yellow Avens

Thickets and woodsides (Bic; Rim.; Cap Chat; Ann.; Lou.; Pcé.; New Carlisle; Tra.; Nou.); burned ground (Car.).

Boreal American: Aleutian Is., Mack., Hudson Bay (Port Nelson), to Nfld., southw. to B.C., N. Mex., Mo., Ill., Pa., and N.J.; e. Asia; with the species, boreal circumpolar.

15. SIBBALDIA L.

1. **S. procumbens** L. [Ch (semi-shrubby)]

Turf below snow patch of alpine slopes (Alb.; Tbl.); mossy alpine woods (Log.).

Arctic circumpolar, alpine: Aleutian Is., Alaska, Yukon, Mack. (Mack. R. Delta, Great Bear L.), Keewatin, Hudson Str., Baffin, n. Lab., and Nfld., southw. in the mts. to Calif. and N.H.; w. and e. Greenland; Iceland; Faeroes; arctic and alpine Eurasia.

16. FILIPENDULA (Tourn.) Adans.

1. F. ULMARIA (L.) Maxim. [Hp] (*Spiraea Ulmaria L.*) Queen of the Meadow

Railway ballast (Mat.); roadside (Dou.).

Eurasian: adventive and a garden escape in temperate eastern N.A.; Iceland; Faeroes.

49. LEGUMINOSAE
(Pulse Family)

[Fassett: The leguminous plants of Wisconsin; University of Wisconsin Press, Madison, 157 pp., 1939.]

a. Leaves pinnate, terminated by a tendril; stamens diadelphous; pods continuous, 2-valved.
  b. Wings of the corolla coherent with the keel; styles filiform, bearded at the summit only........1. *Vicia*
  b. Wings nearly free; styles flat, bearded down the inner face........2. *Lathyrus*

a. Leaves pinnate or digitately 3-foliolate, without tendrils.
  b. Stamens monadelphous; flowers yellow to crimson, loosely capitate, the heads involucrate; pod included in the calyx, nearly or quite indehiscent; leaflets mostly 5-13........3. *Anthyllis*

b. Stamens diadelphous, 9 and 1.
c. Pods formed of separable articulated joints.
d. Leaves pinnate, the leaflets non-stipellate; stipules scaly, united opposite the petiole; corolla reddish purple; calyx 5-cleft; pods smooth......4. *Hedysarum*
d. Leaves 3-foliolate, the leaflets stipellate; stipules small and inconspicuous, mostly deciduous; corolla purple or bluish purple; calyx 2-lipped; pods hairy..5. *Desmodium*
c. Pods not articulated.
d. Leaves pinnate, the leaflets numerous.
e. Keel tipped with an erect point; plants nearly acaulescent......6. *Oxytropis*
e. Keel obtuse; stems leafy...................................7. *Astragalus*
d. Leaves 3-foliolate.
e. Pods straight.
f. Flowers in spikes; stamens free from the corolla, the filaments not dilated; corolla usually deciduous................................8. *Melilotus*
f. Flowers capitate; stamens adhering to the corolla, the filaments dilated at summit; corolla drying without falling...................9. *Trifolium*
e. Pods curved or coiled.....................................10. *Medicago*

1. VICIA (Tourn.) L.

(Vetch. Tare)

a. Flowers sessile or nearly so, few, 1-2 in the axils.
b. Leaflets 5-7 pairs, oblong, oval or obovate, truncate to emarginate, mucronate; flowers 2-3 cm. long; pods 4-6 cm. long, pubescent and pale tawny at maturity...1. *V. sativa*
b. Leaflets 2-5 pairs, mucronate; flowers 1-1·8 cm. long; pods 3-4 cm. long, smooth and black at maturity.
c. Leaflets of upper leaves linear- to lance-attenuate, 1-4 mm. broad...2. *V. angustifolia*
c. Leaflets of upper leaves truncate or emarginate at apex, oblong to oblong-obovate, 2-8 mm. broad.......................2a. *V. angustifolia*, var. *segetalis*

a. Flowers in a 1-sided spike or raceme; peduncles well developed.
b. Flowers 2-4 mm. long; seeds 2-4; annuals.
c. Pods narrow, 4-seeded, smooth; corolla bluish, the peduncles 1-2-flowered; leaflets 4-6 pairs, linear-oblong, obtuse; calyx-teeth unequal....3. *V. tetrasperma*
c. Pods oblong, 2-seeded, hairy; corolla whitish, the peduncles 3-6-flowered; leaflets 6-8 pairs, truncate; calyx-teeth equal.....................4. *V. hirsuta*
b. Flowers 6-12 mm. long, bluish purple; racemes 8-40-flowered; seeds 6 or more; leaflets 4-12 pairs..5. *V. Cracca*

1. V. SATIVA L. [T] Spring Vetch

Grain field (Pcé.); cultivated for fodder, sometimes escaped (Dan.).
Eurasian: naturalized in temperate eastern N.A.

2. V. ANGUSTIFOLIA (L.) Reichard. [T] Common Vetch

Gravelly beach (Drt.; Dou.; Pas.; Bon.); waste land (Pcé.; Mar.; Car.).
European: naturalized in temperate eastern N.A. and Greenland.

2a. V. ANGUSTIFOLIA, var. SEGETALIS (Thuillier) Koch.

Shore (Mtn.); railway embankment (Mar.).
Range of the species.

3. V. TETRASPERMA (L.) Moench. [T] Slender Vetch

Bare schists (Mad.); waste places (Bic; Mar.; Car.).
European: naturalized in temperate eastern N.A.

4. V. HIRSUTA (L.) S. F. Gray. [T] Hairy Vetch

Gravelly spits (Pas.; Car.); ballast and burned land (Yrk.; Mar.; Car.).
European: naturalized in temperate eastern N.A.

5. V. CRACCA L. [Hp] Cow Vetch. Bluebirds

Sea cliffs (Bic; Mét.; Gnd.); river gravels (Ann.; Drt.; PCa.); beaches (Pén.; Pas.); fields (Bic; Rim.; Gpe.; Irn.).
Eurasian: naturalized throughout temperate N.A.

2. LATHYRUS (Tourn.) L.
(Everlasting Pea)

a. Leaflets 1 pair.
  b. Flowers showy, purple, pink, or white; leaflets elliptic to lanceolate, 0·5-1 dm. long, they and the stipules coriaceous and veiny; stems broadly winged..........................1. *L. latifolius*
  b. Flowers yellow; leaflets narrowly lanceolate to linear; stipules foliaceous; stem not winged..........................2. *L. pratensis*

a. Leaflets 3-7 pairs; flowers purple.
  b. Stipules broadly ovate, regularly halberd-shaped, nearly as large as the leaflets; leaflets thick, ovate-oblong; flowers 1·8-2·5 cm. long.
    c. Plants essentially glabrous..........................3. *L. japonicus*, var. *glaber*
    c. Stems, lower surface of leaves, peduncles, rhachises, etc., densely pilose..........................3a. *L. japonicus*, var. *pellitus*
  b. Stipules narrower, semi-sagittate.
    c. Leaflets 8-12 on the principal leaves, ovate or oval, about 5 cm. long; flowers 10-25, 1·2-1·6 cm. long..........................4. *L. venosus*, var. *intonsus*
    c. Leaflets 4-8 on the principal leaves, lanceolate to elliptic, 3·5-7 cm. long; flowers 2-8, 1·6-2·5 cm. long.
      d. Stem comparatively stout, excluding the wings 1·5-3 mm. thick below the lowest peduncle.
        e. Stems, leaves, etc., glabrous..........................5. *L. palustris*
        e. Stems, leaves, calyces, and pods finely pubescent..........................5a. *L. palustris*, var. *macranthus*
      d. Stem comparatively slender, 0·5-1·5 mm. thick below the lowest peduncle.
        e. Stems 1-6 dm. high; leaflets linear, lanceolate, or narrowly oblong, 2·5-5·5 cm. long, 1·5-9 mm. broad; peduncles 2-5-flowered.
          f. Stems, leaves, etc., glabrous..............5b. *L. palustris*, var. *linearifolius*
          f. Stems, leaves, calyces, and pods pubescent......5c. *L. palustris*, var. *pilosus*
        e. Stems 3-10 dm. high; leaflets ovate, elliptical, or broadly lanceolate, 2-4 cm. long, 6-17 mm. broad; peduncles 3-9-flowered..........................5d. *L. palustris*, var. *myrtifolius*

1. L. LATIFOLIUS L. [Hpr]

Swampy ground (Pas.; Bon.); railway embankment (St. Omer).
European: frequently cultivated and escaping.

2. L. PRATENSIS L. [Hpr] Yellow Vetchling

Roadside fences (Bic; Rim.; Pcé.).
European: naturalized in temperate eastern N.A.; Iceland; Faeroes.

3. **L. japonicus** Willd., var. **glaber** (Ser.) Fernald, *See* Rhod. 34: 181. 1932. [Grh] (*L. maritimus* (L.) Bigel.) Beach Pea

Psammophilous halophyte: sea beaches (Bic; Fla.; Trl.; Rivière à la Martre; Pcé.; Car.). General in its habitat.

(Boreal-) temperate ?circumpolar (essentially maritime): s. B.C. to n. Calif.; central Man., Great Lakes region, Que. (Lake St. John, Gaspe Peninsula, Magdalen Is.), and Nfld., southw. along the coast to N.J.; coast of Europe from (?Spain) France to Finland; Japan.

3a. **L. japonicus,** var. **pellitus** Fernald, Rhod. 34: 183. 1932.

Psammophilous halophyte: sea beaches (Bic; Pén.).

(Boreal-) temperate eastern American (maritime): Great Lakes region; n. Vt. to Mingan Is. and Nfld., southw. to N.J.

4. **L. venosus** Muhl., var. **intonsus** Butters & St. John, Rhod. 19: 158. 1917. [Hp] (*L. venosus* in part of Gray's Man., ed. 7; *L. Rollandii* Victorin & Rousseau, Contrib. Inst. Bot. Univ. Montréal, No. 36: 22. 1940.)

Calcicole: river gravels (PCa.).

Temperate American: s. Sask. to s. Ont., southw. to Ark., Tenn., and W. Va.; Gaspe Peninsula.

5. **L. palustris** L. [Hp] Marsh Pea

Swampy soil (Rim.).

(Boreal-) temperate ?circumpolar: Vancouver I. to n. Oreg.; s. Man., James Bay, Anticosti I., and Nfld., southw. to Mo., Ill., Pa., and Conn.; Iceland; Eurasia.

5a. **L. palustris,** var. **macranthus** (White) Fernald, *See* Rhod. 13: 50. 1911.

Sea beach (Bic); slaty talus (Prr.); habitat not stated (Fla.; Bon.).

(Boreal-) temperate American: s. Alaska to Oreg.; s. Man., James Bay, Anticosti I., and Nfld., southw. to R.I.; e. Asia.

5b. **L. palustris,** var. **linearifolius** Seringe.

Sea beach (Ste. Luce).

(Boreal-) temperate ?circumpolar: Alaska, s. Alb., s. Sask., Minn., s. Ont., and e. Que., southw. to Colo., Ill., Ohio, and Conn.; Eurasia.

5c. **L. palustris,** var. **pilosus** (Cham.) Ledeb.

Slaty sea ridges (Bic); sea cliffs (Prr.; Ren.); alluvial soil at river mouths (Dan.; Bon.); wet places (Val.; Anse aux Canards); brackish marsh (Bic); sea beaches (Fla.; Mét.; Srl.; New Carlisle).

(Arctic-) boreal American: Aleutian Is., Alaska, and Yukon to n. Oreg.; Minn. to s. Lab. (isolated station in northernmost Lab.) and Nfld., southw. to Conn.; e. Asia.

5d. **L. palustris,** var. **myrtifolius** (Muhl.) Gray.

Dry gravelly beach (Car.); wet meadows (Bic).

Temperate American: Man. to e. Que., southw. to Ind. and N.J.

3. ANTHYLLIS (Riv.) L.

1. A. VULNERARIA L. [Hs]

Calcicole: slaty river ledges (Res.).

European: adventive in temperate eastern N.A.; Iceland.

4. Hedysarum (Tourn.) L.

1. **H. alpinum** L., var. **americanum** Michx. [Hp] (*H. americanum* Britton; *See* Rollins, Rhod. 42: 222. 1940.)

Calcicole: sea cliffs (Bic; Trl.; Srl.; Prr.; Plr.; Mad.; For.; Pcé.; Bon. I.); river ledges and gravels (Ann.; Drt.; Jhn.; Gnd.; Pab.; Bon.; New Richmond; GCa.; Mat.); cliffs above lake (Lac Pleureuse).

Arctic American: Alaska, Yukon, Mack. (Mack. R. Delta, Great Bear L., Coronation Gulf), Victoria I., Hudson Bay (Chesterfield Inlet), Ungava Bay, s. Lab., and Nfld., southw. to B.C., Wyo., S. Dak., s. Que., N.H., and Me.

Var. *americanum,* forma *albiflorum* (Standley) Fernald (*See* Rhod. 35: 275. 1933), with white flowers, has been collected from calcareous ledges at Rimouski.

5. Desmodium Desv.

(Tick Trefoil)

1. **D. canadense** (L.) DC. [Hp]

Calcicole: river gravels (Mat.) (northeastern limit).

Temperate American: Man. to e. Que. and N.S., southw. to Okla., Ill., Ohio, Pa., and N.J.

6. Oxytropis DC.

[Fernald: The genus Oxytropis in northeastern America; Rhod. 30: 137-155. 1928.]

a. Stipules nearly free from the petioles; flowers and fruits reflexed, the latter becoming secund, 1-1·5 cm. long, 3-4 mm. broad, black-hirsute; corolla violet, at most 1 cm. long; calyx black-pilose, the tube 2·6-3·5 mm. long, truncate at summit, about equalled by the lance-subulate lobes, the sinuses rounded and broad; spike subglobose to ovoid, compact, 1-3 cm. long, 2-10-flowered; leaflets 15-29, 2-8 mm. long, appressed-pilose...1. *O. foliolosa*

a. Stipules strongly adnate to the petioles; flowers and fruits ascending or spreading, not secund; corollas 1-2 cm. long.

  b. Leaflets 30-35, oblong or oblong-lanceolate, 8-13 mm. long, loosely strigose-villous on both surfaces and somewhat viscid (staining pressing-paper yellow); spike dense, in anthesis 2-3 cm. long, in fruit 3-5 cm. long; calyx-tube 4-5 mm. long, the teeth deltoid, viscid, 1-2 mm. long; corolla yellowish white, 1-1·2 cm. long, with a purple spot on the keel; pods short-ovoid, 1-1·3 cm. long, abruptly acuminate, viscid and white-villous...2. *O. gaspensis*

  b. Leaflets 15-31, linear-lanceolate to oblong, 6-30 mm. long, densely sericeous to glabrate; spikes elongating and loose in maturity, 2-11 cm. long; calyx-tube 5-7 mm. long, the teeth lanceolate, pubescent, 1·5-3 mm. long; corolla purple or purple-violet, 1·5-2 cm. long; pods thick-cylindric to obliquely lance-ovoid, 1·5-2 cm. long, appressed-pubescent with black, white, or mixed hairs, tapering to a straightish beak...3. *O. johannensis*

1. **O. foliolosa** Hook. [Ch (semi-shrubby)]

Calcicole: talus below sea cliffs (Plr.).

Disjunct American: Alaska, Yukon, Mack. (Mack. R. Delta, Coronation Gulf), southw. in the mts. to B.C., Idaho, and Colo.; Hudson Str., s. Baffin, n. Lab., Nfld., and Gaspe Peninsula; closely related to the Eurasian *O. lapponica* (Wahl.) Gaud.

2. **O. gaspensis** Fern. & Kelsey, Rhod. 30: 123. 1928. [Ch (semi-shrubby)]

Calcicole: sea cliffs (Prr. (type station); Lou.).

Local endemic: representative of the cordilleran *O. viscida* Nutt. and *O. viscidula* (Rydb.) Tidestrom.

3. **O. johannensis** Fernald. [Ch (semi-shrubby)] (*O. campestris,* var. *johannensis* Fernald.)

Calcicole: sea cliffs (Bic; Lou.; Pcé.; Bon. I.); river ledges and gravels (Drt.; Gnd.; Pab.; Res.; Mat.).

Boreal eastern American: s. James Bay to w. Nfld., southw. to N.B. and Me.; with *O. campestris* (L.) DC., boreal circumpolar.

Forma *bicensis* Victorin & Rousseau, with abruptly acuminate pods (Contrib. Inst. Bot. Univ. Montréal, No. 36: 32. 1940), has been collected from the sea cliffs at Bic, the type station.

7. ASTRAGALUS (Tourn.) L.

[Rousseau: Les Astragalus du Québec et leurs alliés immédiats; Contrib. Lab. Bot. Univ. Montréal, No. 24: 11-66. 1933. Rousseau: Deux nouveaux Astragalus du Québec; Naturaliste Canadien 71: 5-14. 1944 (Nouvelle clef des Astragalus du Québec, pp. 13-14).]

a. Branches and leaves strongly ashy-tomentose; leaflets 9-11, oblong-lanceolate, obtuse, sessile, 10-25 mm. long; racemes lax, with 7-17 white flowers; pods elliptic-lanceolate, compressed, arcuate, 2-3·2 cm. long, slightly pubescent, acute at summit, attenuate at base........1. *A. scrupulicola*

a. Branches and leaves more or less pubescent, not ashy-tomentose.
  b. Flowers blue; stems decumbent.
    c. Flowers 10-13 mm. long, 4-15 in a lax raceme; pods 13-16 mm. long, slightly curved, somewhat flattened, stipitate, slightly pubescent, attenuate at base; leaflets 13-25, ovate to oblong-lanceolate, slightly pubescent beneath, 4-17 mm. long........2. *A. alpinus*, var. *Brunetianus*
    c. Flowers 6-8 mm. long, 12-22 in an erect raceme; pods ovate-oblong, strongly flattened, sessile, blackish-puberulent, 7-12 mm. long; leaflets 9-17, oblong, with appressed hairs beneath, 12-25 mm. long........3. *A. eucosmus*
  b. Flowers yellowish white, 12-35 in a lax raceme, about 13 mm. long; pods ovoid, glabrous, about 2 cm. long, the stipe 7-8 mm. long; leaflets 7-15, ovate-lanceolate, truncate or emarginate at summit, pubescent beneath, 1-5 cm. long........4. *A. frigidus*, var. *gaspensis*

1. **A. scrupulicola** Fern. & Weath., Rhod. 33: 238. 1931. [Ch (semi-shrubby)]

Calcicole: slaty sea cliffs (Prr.) (type station).

Local endemic: representative of the western American-eastern Asiatic *A. aboriginum* Richards.

2. **A. alpinus** L., var. **Brunetianus** Fernald. [Ch (semi-shrubby)] (*A. Brunetianus* Rousseau; *See* Fernald, Rhod. 39: 315-317. 1937.)

Calcicole: river gravels (Mat.; Res.).

Temperate eastern American: Gaspe Peninsula, N.B., Me., and N.H.; the whole species arctic circumpolar.

3. **A. eucosmus** Robinson. [Ch (semi-shrubby)] (*A. elegans* Britton.)

Calcicole: river ledges and gravels (Mtn.; Ann.; Bon.; Mat.); cliffs above lake (Lac Pleureuse).

Arctic American: Alaska, Yukon, Mack. (Mack. R. Delta, Great Bear L.), Hudson Bay (Churchill), Hudson Str., s. Baffin, n. Lab., and Nfld., southw. to Me., and in the mts. to Mont., Wyo., and Colo.; closely related to the Eurasian *A. norvegica* Grauer.

4. **A. frigidus** (L.) Gray, var. **gaspensis** (Rousseau) Fernald. [Hpr] (*A. gaspensis* Rousseau, Contr. Lab. Bot. Univ. Montréal, No. 24: 51. 1933; *See* Fernald, Rhod. 39: 313-315. 1937.)

Calcicole: river ledges and gravels (Rim.; PCa. (type station); Bon.).
Gaspe endemic: with the species and the western American var. *americanus*, boreal circumpolar.

8. MELILOTUS (Tourn.) Mill.

a. Flowers white, 3-5 mm. long; pod somewhat reticulate....................1. *M. alba*
a. Flowers yellow, 5-6 mm. long; pod prominently cross-ribbed..........2. *M. officinalis*

1. M. ALBA Desr. [Hs] White Sweet Clover

Fields and waste places (Bic; Rim.; Pte. au Père; Cap Chat; Pas.; Car.); river gravels (Mat.).
Eurasian: naturalized throughout temperate N.A.

2. M. OFFICINALIS (L.) Lam. [Hs] Yellow Sweet Clover

Fields and roadsides (Bic).
Eurasian: naturalized throughout temperate N.A.

9. TRIFOLIUM (Tourn.) L.
(Clover. Trefoil)

a. Flowers purplish, sessile or nearly so in dense globose or ovoid heads.
  b. Calyx soft-hairy; heads sessile or sometimes pedunculate; stems somewhat hairy; leaflets oval or obovate, finely denticulate, often notched at the end and marked above with a pale spot..1. *T. pratense*
  b. Calyx-tube nearly or quite glabrous; heads mostly stalked; stems zigzag, smoothish; leaflets oblong, entire....................................2. *T. medium*
a. Flowers pedicellate in looser heads.
  b. Corolla white or pinkish-tinged.
    c. Stems closely creeping and rooting, the peduncles arising from the ground; flowers white; tip of the leaflets usually notched....................3. *T. repens*
    c. Stems erect or ascending, not rooting at the nodes; flowers pinkish-tinged; leaflets blunt to rounded at the apex..............................4. *T. hybridum*
  b. Corolla yellow; plants and leaves small.
    c. Leaflets all sessile, obovate-oblong; stipules narrow, cohering with the petiole for more than half its length....................................5. *T. agrarium*
    c. Terminal leaflet stalked, the leaflets wedge-obovate, notched at the end; stipules ovate, short...6. *T. procumbens*

1. T. PRATENSE L. [Hp] Red Clover

Sea cliffs (Bic); fields and roadsides (Bic; Rim.; Mét.; Pcé.); ballast-filling about fish-houses (Yrk.). General.

Eurasian: naturalized throughout temperate N.A.; Fernald (Rhod. 45: 331. 1943) separates the coarser, longer-lived, cultivated plant as var. *sativum* (Mill.) Schreb.

2. T. MEDIUM L. [Hpr] Zigzag Clover
River gravels (Mat.).
European: naturalized in temperate eastern N.A.

3. T. REPENS L. [Hrr] Creeping White Clover
Waste places (Mét.; Car.).
Eurasian: naturalized throughout temperate N.A.

4. T. HYBRIDUM L. [Hp] Alsike Clover
Fields and roadsides (Mét.; Canton Pinault; Canton Jetté).
European: naturalized throughout temperate N.A.

5. T. AGRARIUM L. [T] Yellow Hop Clover
Fields and roadsides (Bic; Rim.; Cap Chat; Srl.; Zén.).
European: naturalized throughout temperate eastern N.A.

6. T. PROCUMBENS L. [T] Low Hop Clover
River gravels (Bon.); gravels of spit (Pas.); fields (Lou.).
European: naturalized throughout temperate N.A.

10. MEDICAGO (Tourn.) L.

a. Flowers bluish purple, in short racemes; pods pubescent, twisted into 2 or 3 spires; perennial .... 1. *M. sativa*

a. Flowers yellow in spikes or heads; pods reniform or tightly coiled; annuals.
  b. Pods reniform, unarmed, 1-seeded, black when ripe.
    c. Pods glabrous .... 2. *M. lupulina*
    c. Pods glandular-villous .... 2a. *M. lupulina*, var. *glandulosa*
  b. Pods tightly coiled, armed with curved prickles, deeply reticulated and with a thin keeled edge .... 3. *M. hispida*

1. M. SATIVA L. [Hp] Alfalfa. Lucerne
Roadsides and fields (Rim.; Trl.).
European: widely cultivated in N.A. and escaping freely.

2. M. LUPULINA L. [T.] Black Medick
Fields and waste places (Rim.; Yrk.; Bon.; Mar.; Car.; Mat.).
Eurasian: widely naturalized in N.A.

2a. M. LUPULINA, var. GLANDULOSA Neilr.
Waste ground (Yrk.; Car.); gravelly beach (Car.).
Probably range of the species.

3. M. HISPIDA Gaertn. [T] Bur Clover
Ballast-filling about fish-houses (Yrk.).
European: naturalized in temperate eastern N.A.; a fodder plant westward.

50. LINACEAE
(Flax Family)

1. LINUM (Tourn.) L.
(Flax)

1. L. USITATISSIMUM L. [T] Common Flax
Railway ballast (Mat.).
European: widely cultivated in temperate N.A.

51. OXALIDACEAE
(Wood Sorrel Family)

1. Oxalis L.
(Wood Sorrel)

a. Flowers pale pink or white, purple-veined, solitary on naked scapes; rootstock creeping..1. *O. montana*

a. Flowers yellow; stems leafy.

  b. Flowers 2-4 together, subumbellate; pedicels in fruit reflexed but capsules erect, these 15-25 mm. long, densely puberulent, abruptly acute, short-beaked; stipules oblong, firm; true rhizomes wanting................................2. *O. stricta*

  b. Flowers 2-many, cymose; pedicels spreading, not reflexed; capsules 5-12 mm. long, with scattered hairs or nearly glabrous, tapering to the long strigose styles; stipules obsolete; plants producing long, slender, horizontal rhizomes..3. *O. europaea*

1. **O. montana** Raf. [Hrr] (*O. Acetosella* of Gray's Man., ed. 7.) Pink Wood Sorrel

Conifer woods (Bic; Rim.; Trl.; Ann.; Gnd.; GCa.); subalpine woods (Tbl.; Bln.). General in its habitat.

Temperate American: Sask. to Côte Nord and e. Que., southw. to N.Y., and in the mts. to N.C.

2. **O. stricta** L. [T] Yellow Wood Sorrel

River bank (Mat.); open ground (Bon.).

Temperate American: B.C. to e. Que., southw. to Mex. and Fla.

3. **O. europaea** Jord. [Hpr] (*O. corniculata* of Gray's Man., ed. 7; *See* Wiegand, Rhod. 27: 134. 1925.)

Woods (Bic; New Carlisle; Car.); river banks (Rim.; Gnd.; Bon.; Mat.).

Temperate American: N. Dak. to e. Que., southw. to Ariz., Colo., Okla., Tenn., and Ga.; introduced into Europe.

52. GERANIACEAE
(Geranium Family)

a. Anther-bearing stamens 5; tails of the carpels bearded within, not upcurled but often spirally twisted when ripe; sepals bristle-tipped; leaves pinnate, the leaflets 1-2-pinnatifid.. 1. *Erodium*

a. Anther-bearing stamens 10, rarely 5; tails of the carpels not bearded, upcurled when ripe; leaves palmately veined..................................2. *Geranium*

1. Erodium l'Hér.
(Storksbill)

1. E. CICUTARIUM (L.) l'Hér. [T]

Dry slaty fields (Bic; Rim.); near a garden (Bic); potato field (Ste. Luce); upper beach (Fla.); habitat not stated (Pte. au Père; Car.).

European: naturalized throughout temperate N.A.; Iceland.

2. GERANIUM (Tourn.) L.
(Cranesbill)

a. Flowers purplish blue, the petals about 15 mm. long; fruit 30 mm. long; pedicels and beak glandular-pubescent; leaves mostly 7-parted..................1. *G. pratense*

a. Flowers smaller, the petals less than 12 mm. long; fruit 7-20 mm. long.
  b. Leaves palmately 3-5-divided, the divisions 1-2-pinnatifid; corolla 10-12 mm. long, red-purple; lobes of the ovary glabrous, wrinkled, separating from the valves of the smooth beak...2. *G. Robertianum*
  b. Leaves palmately 3-5-cleft or -parted, the lobes cleft; corolla less than 10 mm. long, rose-colour; lobes of the ovary hairy, not wrinkled, not separating from the valves of the beak; beak pubescent...........................3. *G. Bicknellii*

1. G. PRATENSE L. [Hsr] Meadow Cranesbill

Roadside (Drt.); fields (New Carlisle; Bon.; St. Simon).

Eurasian: naturalized in temperate eastern N.A.

2. **G. Robertianum** L. [Hs] Herb Robert

Calcicole: talus of sea cliffs (Marsouins; Cld.; Pcé.; Bon. I.).

(Boreal-)temperate circumpolar: Man. to Nfld., southw. to Mo. and N.J.; Eurasia; Africa.

3. **G. Bicknellii** Britt. [T] (*See* Fernald, Rhod. 43: 35. 1941; 44: 91. 1942.)

Calcicole: shingle beach of marly pond (Lac Porc-Epic, Bic).

Boreal American: Alaska, Yukon, s. Mack., n. Sask., Man., Ont., e. Que., and Nfld., southw. to Wash., Utah, Minn., Mich., and s. N.Y.

53. POLYGALACEAE
(Milkwort Family)

1. POLYGALA (Tourn.) L.
(Milkwort)

1. **P. paucifolia** Willd. [Hpr] Fringed Polygala

Alluvial thickets and river banks (Gnd.).

Temperate American: Man. to ?Mingan Is. and e. Que., southw. to Minn., Ill., and Ga.

54. EUPHORBIACEAE
(Spurge Family)

1. EUPHORBIA L.
(Spurge. Wartweed)

a. Flowers axillary or on short leafy branches; leaves opposite, 6-12 mm. long; plant low and prostrate..1. *E. vermiculata*

a. Flowers in terminal umbels, these divided into 5 rays, then into 3, or at length simply forked; lower leaves alternate; plant erect................2. *E. Helioscopia*

1. **E. vermiculata** Raf. [T] Hairy Spurge

Railway ballast (Mat.).

Temperate eastern American: w. Ont. to e. Que., southw. to Ill., Ohio, and N.J.

2. E. HELIOSCOPIA L. [T] Wartweed

Dry fields and roadsides (Bic; Mét.; R. Blanche; Prr.; Car.); sea beach (Trl.).

European: naturalized in temperate eastern N.A.

55. CALLITRICHACEAE
(Water Starwort Family)

1. CALLITRICHE L.
(Water Starwort)

a. Fruit longer than broad, obovate, slightly notched, longer than the styles, each half with 2 sharp keels separated by a wide groove; floating leaves obovate, 3-nerved, crowded in a tuft; submersed leaves linear.............1. *C. palustris*

a. Fruit suborbicular, widely notched, each half obtusely 2-keeled, with a narrow groove between the keels.

 b. Stem not 2-edged, 5-25 cm. long; floating leaves crowded in a tuft, broadly spatulate, often retuse, abruptly narrowed into a long petiole; submersed leaves linear; fruit usually slightly less than 1 mm. long, the stigmas persistent.. 2. *C. heterophylla*

 b. Stem strongly compressed, 2-edged, simple or subsimple, low, 5-25 mm. long, the internodes very short, 1-4 mm. long; leaves uniform, linear, 2-7 mm. long, slightly emarginate at apex; fruit 0·5-0·8 mm. long, the stigmas promptly deciduous.. 3. *C. anceps*

1. **C. palustris** L. [HH] (*C. verna* L., in part.)

Streams and rivers (Pte. au Père; Mtn.; Yrk.; Cha.; Dan.; Nou.; Irn.); swampy ground (Bic; Cap Chat; New Richmond).

(Arctic-)boreal circumpolar: Aleutian Is., Alaska, Yukon, Mack. (Mack. R. Delta, Great Bear L.), Hudson Bay (Chesterfield Inlet), s. Lab., and Nfld., southw. to Calif., Tex., and Fla.; w. and e. Greenland; Iceland; Eurasia.

2. **C. heterophylla** Pursh. [HH]

Calcicole: pond in cedar swamp (Bic); river edge (PCa.).

(Boreal-)temperate American: Kodiak I. and Man. to Nfld., southw. to N. Mex., Tex., La., and Fla.

3. **C. anceps** Fernald, Rhod. 10: 51. 1908. [HH]

Subalpine lakes (Tbl.; Log.; Mtt.) (type from Lac des Américains, Tbl.).

Disjunct American: Yukon; n. Lab. and Nfld., southw. to Gaspe, and Mt. Mansfield, Vt.; sw., s., and se. Greenland.

56. EMPETRACEAE
(Crowberry Family)

1. Empetrum (Tourn.) L.
(Crowberry)

1. **E. nigrum** L. [Ch (passive) Evergreen]

Sea cliffs and ridges (Bic; Rim.; R. Blanche; Cap Chat; Srl.; Marsouins; Val.; For.; Mal.; Pcé.; Bon. I.; Gnd.; Newport; Bon.); sands of spit (Pén.; Cha.); alpine bog (Str.); alpine rocks (Alb.; Tbl.; Log.; Ftn.).

Arctic circumpolar, alpine: Aleutian Is., n. coast of Alaska, Yukon, and Mack., Somerset I., Ellesmere, Devon, Baffin, Melville, Southampton I., Hudson Str., n. Lab., and Nfld., southw. to the Great Lakes and mts. of n. Calif. and N. Eng.; w. and e. Greenland; Iceland; Faeroes; Spitsbergen; arctic and alpine Eurasia.

Forma *purpureum* (Raf.) Fernald, with ripe berries purple rather than black (*See* Fernald, Rhod. 25: 83. 1923), has been collected on bare alpine schists (Ftn.).

57. ANACARDIACEAE
(Cashew Family)

1. Rhus (Tourn.) L.

a. Leaves pinnate, with 11-31 leaflets, pale beneath; branches and stalks densely velvety-hairy; flowers in a terminal thyrsoid panicle; fruit clothed with acid crimson hairs; stone smooth........1. *R. typhina*

a. Leaves 3-foliolate, the leaflets ovate to rhombic, entire or irregularly and coarsely few-toothed; flowers in loose and slender axillary panicles; fruit whitish or cream-colour, glabrous or nearly so........2. *R. radicans*, var. *Rydbergii*

1. **R. typhina** L. [M] Staghorn Sumach

Calcicole: dry limestone-conglomerate cliffs (Bic); roadside thicket (Bic); fields (Car.; Nou.; Mat.).

Temperate eastern American: Ont. to e. Que., southw. to Miss. and Ga.

2. **R. radicans** L., var. **Rydbergii** (Small) Rehder. [Ch (semi-shrubby)] (*R. Toxicodendron*, var. *Rydbergii* (Small) Garrett; *See* Fernald, Rhod. 43: 590. 1941.) Poison Ivy

Calcicole: sea cliffs (Lbn.; Pcé.); river ledges and gravels (Rim.; Drt.; Pab.; Bon.; Nou.; Mat.).

Temperate American: B.C. to e. Que., southw. to N.Eng., and in the mts. to Ariz., N. Mex., and Va.

58. AQUIFOLIACEAE
(Holly Family)

a. Leaves oval, obovate or wedge-lanceolate, pointed, serrate; flowers all very short-peduncled; calyx lobes ciliate on the margins; petals oval; stamens adnate to base of corolla; fruit red........1. *Ilex*

a. Leaves elliptic-oblong, entire; flowers on long slender axillary peduncles, solitary or sparingly clustered; petals linear; stamens free from the corolla......2. *Nemopanthus*

1. ILEX L.

(Winterberry. Black Alder)

1. **I. verticillata** (L.) Gray. [M]

Swampy soil (Lac des Baies, St. Guy, Rimouski co.); borders of marsh (Gpe.).

(Boreal-)temperate eastern American: Wis. to Nfld., southw. to Mo. and Fla.

2. NEMOPANTHUS Raf.

(Mountain Holly)

1. **N. mucronata** (L.) Trel. [N]

Swampy soil (Bic; Rim.; Pte. au Père; Mtn.; Ann.; Yrk.; Dou.; Mal.; PCa.; Mar.); subalpine woods (Str.).

(Boreal-)temperate eastern American: Minn. to Côte Nord and Nfld., southw. to Ind. and N.J., and the mts. of Va.

59. ACERACEAE

(Maple Family)

1. ACER (Tourn.) L.

(Maple)

a. Flowers in terminal racemes, greenish, appearing after the leaves.
  b. Leaves 3-lobed at the apex, finely and sharply double-serrate; petals obovate, about 5 mm. long; racemes drooping, loose; wing of fruit 7-10 mm. wide; bark of young twigs green, striped with white........................*A. pensylvanicum*
  b. Leaves 3(or slightly 5)-lobed, coarsely serrate; petals linear, about 2 mm. long; racemes erect, dense; wing of fruit 3-5 mm. wide; bark reddish brown..........2. *A. spicatum*

a. Flowers not racemose.
  b. Flowers corymbose, unfolding with the leaves, greenish yellow, drooping on long pedicels; petals none; leaves with rounded sinuses between the sparingly sinuate-toothed lobes..........3. *A. saccharum*
  b. Flowers in dense sessile lateral clusters, unfolding before the leaves, scarlet, crimson, or sometimes yellowish; leaves with acute sinuses between the 3-5 irregularly serrate and notched lobes; petals linear-oblong............4. *A. rubrum*

1. **A. pensylvanicum** L. [M] Striped Maple. Moosewood

Hilly woods (Bic; Grand Lac Matane); dry slaty talus (Prr.). General in its habitat.

Temperate eastern American: Great Lakes region to e. Que., southw. to Conn. and in the mts. to Ga.

2. **A. spicatum** Lam. [M] Mountain Maple

Hilly woods (Bic; Mét.; Srl.; Prr.; GCa.; St. Vianney); subalpine woods (Alb.; Log.). General in its habitat.

Boreal American: Sask., Hudson Bay, Lab., and Nfld., southw. to Iowa, Tenn., and N.Y., and in the mts. to Ga.

3. **A. saccharum** Marsh. [MM] Sugar Maple

Woods (Rim.; Cap Chat; Marsouins; Prr.; Lou.; Cld.; Val d'Espoir; Mar.).

(Boreal-)temperate American: Man. to Nfld., southw. to Tex. and Fla.

4. **A. rubrum** L. [MM] Red Maple

Woods (Bic; Rim.; Cap Chat; Pcé.; Dou.; Pas.; Bon.; Car.; Nou.); subalpine woods (Mtt.).

(Boreal-)temperate American: Man. to Nfld., southw. to Kans. and Fla.

60. BALSAMINACEAE
(Touch-me-not Family)

1. Impatiens (Riv.) L.
(Touch-me-not. Jewelweed)

a. Flowers pale yellow, sparingly dotted with brownish red; calyx-sac broader than long, tipped with a short incurved spur .... 1. *I. pallida*

a. Flowers orange, thickly spotted with reddish brown; sac longer than broad, tapering into a strongly inflexed spur half as long as the sac .... 2. *I. capensis*

1. **I. pallida** Nutt. [T] Pale Touch-me-not

Moist shady places (Trl.; Srl.; PCa.; Mat.); alluvial woods (Cap Chat); seacoast (Lou.).

Boreal American: Mack. to Nfld., southw. to Kans. and Ga.

2. **I. capensis** Meerburgh. [T] (*I. biflora* Walt.; *See* Fernald, Rhod. 50: 203-205. 1948.) Spotted Touch-me-not

Moist shady places (Bic; Rim.; Mét.; Drt.; Dou.; Oie; Mat.).

(Boreal-)temperate American: central Alaska and Sask. to Mingan Is. and Nfld., southw. to Nebr. and Fla.

61. RHAMNACEAE
(Buckthorn Family)

1. Rhamnus (Tourn.) L.
(Buckthorn)

1. **R. alnifolia** l'Hér. [N] Swamp Buckthorn

Swamps (Bic; Lou.; Dou.; Mal.; Pcé.; Gnd.; Dan.; New Carlisle; Bon.; PCa.; Nou.; Zén.); cedar swamp (Car.); limestone cliffs (Pcé.).

Boreal American: B.C. to s. James Bay, Mingan Is., and Nfld., southw. to Calif. and N.J.

62. MALVACEAE
(Mallow Family)

1. Malva (Tourn.) L.
(Mallow)

a. Flowers fascicled in the axils, white, the petals twice as long as the sepals; leaves round-heart-shaped, on very long petioles, crenate, obscurely lobed .... 1. *M. rotundifolia*

a. Flowers clustered toward the ends of the branches, rose-colour or white, the petals 6-8 times as long as the calyx; stem-leaves 5-parted, the divisions once or twice parted or cleft into linear lobes....................................2. *M. moschata*

1. M. ROTUNDIFOLIA L. [Hr] Roundleaf Mallow. Cheeses

Roadside (Bic) (apparently true *M. rotundifolia,* with reticulate, sharp-margined carpels; *See* Morton, Rhod. 39: 98-99. 1937).

Eurasian: naturalized throughout temperate N.A.

2. M. MOSCHATA L. [Hs] Musk Mallow

Fields and roadsides (Bic; Rim.; Ros.; Pcé.; New Carlisle; Bon.; Pas.; Car.; Nou.).

European: naturalized throughout N.A. from B.C. to Nfld. and southward.

63. HYPERICACEAE
(St. John's-Wort Family)

1. HYPERICUM (Tourn.) L.
(St. John's-wort)

a. Petals yellow, convolute in the bud.
  b. Stamens 15-40; flowers 6-25 mm. broad.
    c. Stamens in 3-5 clusters; petals marked with black dots or lines; capsules trilocular.
      d. Petals bearing black dots only on the margin, deep yellow; sepals lanceolate, acute; leaves 2-8 mm. broad, with pellucid dots..............1. *H. perforatum*
      d. Petals bearing several rows of dark lines, pale yellow; sepals ovate or ovate-lanceolate; leaves 8-16 mm. broad, rounded at tip............2. *H. punctatum*
    c. Stamens obscurely if at all clustered; petals without black dots, bright yellow; cyme nearly naked; pods ovoid, very obtuse, unilocular.........3. *H. ellipticum*
  b. Stamens 5-12; flowers 1-6 mm. broad; cymes leafy-bracted; stems decumbent and leafy-bracted at base..4. *H. boreale*
a. Petals flesh-colour or purplish, imbricate in the bud; stamens mostly 9, in 3 bundles; leaves closely sessile or clasping by a broad base, very obtuse..................... ....5. *H. virginicum,* var. *Fraseri*

1. H. PERFORATUM L. [Hp] Common St. John's-wort

Roadside (Bic); river gravels (Mat.).

European: naturalized throughout temperate N.A.

2. **H. punctatum** Lam. [Hpr]

Roadside (Bic).

Temperate eastern American: Minn. to e. Que., southw. to Tex. and Fla.

3. **H. ellipticum** Hook. [Hpr]

Bank of stream (Bic); edge of lake (Lac à Foin, Matane co.); swamps (Car.).

Temperate American: Man. to e. Que., southw. to Minn. and Pa.

4. **H. boreale** (Britt.) Bicknell. [Hpr]

Wet places (Bic; Rim.; Cap Chat; Lac à Foin; R. Ouest).

(Boreal-)temperate eastern American: Ont. to Mingan Is. and Nfld., southw. to Ind. and Va.

5. **H. virginicum** L., var. **Fraseri** (Spach) Fernald, *See* Rhod. 39: 434. 1936. [Hpr] Marsh St. John's-wort

Wet places (Bic; Rim.; Cap Chat; Mad.; Tng.; Yrk.; Dou.; Bnc.; New Carlisle; Bon.; Car.; Nou.).

Boreal American: Man. to Lab. and Nfld., southw. to Nebr. and N.Y.; more southerly than the typical form (styles 2-3 mm. long, sepals lanceolate, acute).

64. CISTACEAE

(Rockrose Family)

1. Hudsonia L.

(False Heather)

1. **H. tomentosa** Nutt., var. **intermedia** Peck. [Ch (passive) Evergreen]

Sand dunes (Pén.).

Boreal American: Mack. to Côte Nord and e. Que., southw. to N. Dak. and Vt.; one of the maritime elements in the flora of the Great Lakes.

65. VIOLACEAE

(Violet Family)

[Baird: Wild Violets of North America; University of California Press, 225 pp., 1942.]

1. Viola (Tourn.) L.

(Violet)

a. Plants stemless; leaves and scapes all from rootstocks or runners.
  b. Rootstocks stout, 3-10 mm. thick, short; leaves heart-shaped, crenate-serrate; petals violet-blue to purple, the lateral ones bearded.
    c. Leaf-blades pubescent below, deltoid-ovate, bluish green, rather small, the margins ciliate; petioles slender, slightly hairy above; spurred petal villous; sepals and their auricles ciliolate; cleistogamous flowers sagittate; capsules subglobose or oval, 8-12 mm. long; seeds dark brown, 1·7-1·8 mm. long..1. *V. septentrionalis*
    c. Plants essentially glabrous, leaf margins non-ciliate.
      d. Beard of lateral petals of strongly clavate hairs; cleistogamous flowers sagittate-lanceolate; capsules oblong, green, 10-15 mm. long, but little exceeding the sepals, these narrow, often ciliolate at apex, with lobed auricles; seeds small, 1·4 mm. long, black; leaves acute but scarcely apiculate, deltoid-reniform, inconspicuously crenate.
        e. Sepals long-auricled..2. *V. cucullata*
        e. Auricles of sepals only 1-2 mm. long..........2a. *V. cucullata*, var. *microtitis*
      d. Beard of cylindrical or only slightly clavate hairs; cleistogamous flowers ovoid or ovoid-acuminate.
        e. Cleistogamous flowers mostly on ascending peduncles; capsules 5-10 mm. long.
          f. Spring leaves orbicular or slightly reniform; summer leaves broadly heart-shaped, obtuse, obscurely crenate; sepals obtuse; capsules green, short-ellipsoid; seeds olive-brown............................3. *V. nephrophylla*
          f. Spring leaves narrowly heart-shaped and commonly attenuate toward the apex; summer leaves triangular-ovate, acutish; sepals acute; capsules usually purplish, 4-7 mm. long; seeds buff......................4. *V. affinis*

e. Cleistogamous flowers mostly on short prostrate peduncles; spurred petal often narrow and boat-shaped; capsules 10-15 mm. long; seeds dark brown, 2 mm. long; leaves broad, merely acute or abruptly pointed..5. *V. papilionacea*

b. Rootstocks long and filiform, producing slender runners (except in No. 11).

c. Petals pale lilac or light blue.

d. Spur one-half to two-thirds as long as the limb, subclavate; petals light blue, all beardless; capsules subglobose, usually purple-flecked; seeds 1·2-2 mm. long, pale buff; leaves with a deep basal sinus, the lobes converging and often overlapping; blades thin, coarsely and flatly crenate-serrate, setose above ....6. *V. Selkirkii*

d. Spur very short and obtuse; petals pale lilac, with purple lines, the lateral pair somewhat bearded; flowers small; seeds 1·5 mm. long, dark brown; leaves round-cordate and reniform, slightly crenate, smooth; rootstocks scaly ....7. *V. palustris*

c. Petals white, with purple lines on the 3 lower ones.

d. Capsules ellipsoid, green; seeds ovoid, acute at base, 1 mm. long, black; leaves entirely glabrous, generally small, usually much exceeded by the scapes, usually obtuse and rounded; upper petals broadly obovate, the lateral ones usually beardless; runners often bearing flowers and reduced leaves..8. *V. pallens*

d. Capsules ovoid, usually purplish; seeds larger; leaves with at least a few hairs, larger. rarely exceeded by the scapes.

e. Leaves reniform or ovate-reniform, usually pointed, generally dull; pubescence fine; runners filiform, flowerless.

f. Blades slightly fleshy, glabrous except for a few hairs above; petioles and peduncles usually reddish, the former spreading; flowers rather large; upper petals narrow, lateral ones beardless; seeds ovoid, acute at base, 1·2-1·6 mm. long, black; runners usually with leaves..........9. *V. blanda*

f. Blades thinner, hairy below, more veiny; petioles and peduncles not reddish, the former rather erect; flowers smaller; upper petals broad, lateral ones bearded; seeds oblong, blunt at base, 1·6-1·9 mm. long, brown; runners usually nearly or quite leafless............10. *V. incognita*

e. Leaves orbicular-reniform, large, usually rounded at the tip, waxy-glossy; upper petals orbicular, the lateral ones beardless; seeds as in the last species....................................11. *V. renifolia*, var. *Brainerdii*

a. Plants with leafy stems; flowers axillary.

b. Stipules small, entire or spinulose-dentate; leaves ovate or suborbicular.

c. Decumbent plants with slender main stems; leaves small; flowers blue; style not capitate, slender; length of spur at least twice its width; stipules toothed.

d. Stipules ovate-lanceolate, spinulose-dentate; flowers numerous, usually pale; seeds straw-colour; later leaves subacuminate................12. *V. conspersa*

d. Stipules lance-linear, with 1-2 filiform appendages at base; flowers commonly deep violet; seeds light brown; later leaves rounded to an obtuse (not in the least acuminate) apex.........................13. *V. adunca*, var. *minor*

c. Erect plants with stout main stems; terminal leaves more or less deltoid; stipules ovate, obtuse, entire; flowers yellow; spur short; style capitate, beakless, bearded at the summit.

d. Plant very pubescent; root leaves usually wanting; stem leaves strongly veiny; stipules broadly ovate; capsules glabrous or sometimes woolly; seeds light brown, nearly 3 mm. long.............................14. *V. pubescens*

d. Plant sparingly pubescent; root leaves usually 1-3; stem leaves less veiny; stipules narrowly ovate; capsules glabrous....15. *V. pensylvanica*, var. *leiocarpa*

b. Stipules large, leaf-like, pinnately cleft and lobed at the base; flowers 1·5-2·5 cm. broad, variously marked with yellow, white, and purple; style much enlarged upward into a round hollow summit..............................16. *V. tricolor*

1. **V. septentrionalis** Greene. [Hrr] Northern Blue Violet

Open damp conifer woods (Bic; Rim.; Mtn.; Drt.; GCa.; Car.; Nou.; Mat.); woods at base of mountain (Nic.).

Temperate eastern American: Ont. to e. Que., southw. to Pa. and Conn.

2. **V. cucullata** Ait. [Hrr] Marsh Blue Violet

Woods and thickets (Bic; Rim.; GCa.; Mat.); subalpine woods (Tbl.; Log.; Mtt.).

(Boreal-)temperate eastern American: Ont. to Côte Nord and Nfld., southw. to Ga.

2a. **V. cucullata,** var. **microtitis** Brainerd, Rhod. 15: 112. 1913.

Subalpine meadows (Mtt.; Ftn.).

Gulf endemic: Gaspe, Nfld., and Magdalen Is.

3. **V. nephrophylla** Greene. [Hrr] Northern Bog Violet

Calcicole: river gravels (Ann.; Drt.; Jhn.; Gnd.; Pab.; Bon.; PCa.; GCa.; Esc.; Mat.); sea ledges (Bic; Pcé.).

(Boreal-)temperate American: s. Mack., s. James Bay, Mingan Is., and Nfld., southw. to B.C., the Great Lakes, and Conn., and in the mts. to s. Calif., Ariz., and N. Mex.

4. **V. affinis** Le Conte. [Hrr]

Gravelly bank (Mat.); swampy soil (Montagne Blanche, Rimouski co.).

Boreal eastern American: Wis. to s. James Bay and e. Que., southw. to Ala. and Ga.

5. **V. papilionacea** Pursh. [Hrr] Meadow Blue Violet

Damp woods (Lou.).

Temperate eastern American: Minn. to e. Que., southw. to Okla. and Ga.; apparently introduced in Colo.

6. **V. Selkirkii** Pursh. [Hrr] Great-spurred Violet

Cold woods (Bic; Rim.; Plr.); bog (Bic); river alluvium (Ann.; Gnd.; GCa.; Nou.); subalpine woods (Alb.; Log.; Mtt.).

Boreal circumpolar: Alaska and B.C. to Lab. and Nfld., southw. to Colo. and Pa.; e. Greenland; Eurasia.

7. **V. palustris** L. [Hrr]

Alpine meadows and slopes (Alb.; Tbl.; Log.); brookside below mountain (Mtt.).

Boreal circumpolar, alpine: Alaska, Alb., and Sask. to Lab. and Nfld., southw. in the mts. to Colo. and N.H.; s. Greenland; Iceland; Faeroes; Eurasia.

8. **V. pallens** (Banks) Brainerd. [Hrr] Small White Violet

Woods and brook banks (Bic; Rim.; Mét.; Ann.; Gnd.); brackish marsh (Gpe.); subalpine slopes (Alb.; Lac Ste. Anne, Tbl.; Log.; Lyl.).

Boreal American: central Alaska, Yukon, Mack. (Great Bear L.), Keewatin, James Bay, middle Lab., and Nfld., southw. to Tenn. and S.C., and in the mts. to Colo.

9. **V. blanda** Willd. [Hrr] Red-stem White Violet

Wet places (R. Blanche; Alb.).

(Boreal-)temperate American: Yukon, Minn. to Nfld., southw. to N. Eng., and in the mts. to Ga.

10. **V. incognita** Brainerd. [Hrr] Large-leaved White Violet

Moist woods (Bic; R. Blanche; Grand Lac Matane; Prr.; Lou.; Mad.; Val.; Pcé.; Gnd.: GCa.; Mat.; Irn.); subalpine woods (Alb.; Log).

Boreal American: N. Dak. to Lab. and Nfld., southw. to the mts. of Tenn.

11. **V. renifolia** A. Gray, var. **Brainerdii** Fernald. [Hr]

Woods (Bic; Rim.; Mtn.; Ann.; Prr.; Mad.; For.; Yrk.; GCa.; Tra.); field (Bic); sea cliffs (Srl.); alpine slopes (Alb.; Tbl.; Log.; Mtt.).

Boreal American: Alaska, Yukon, Mack. (Great Bear L.), James Bay, s. Lab., and Nfld., southw. to B.C., Mich., Pa., and N. Eng.

12. **V. conspersa** Reich. [Hsr] Dog Violet

Calcicole: river gravels (Drt.); alluvial woods (Cap Chat; Gnd.; GCa.).
Psammophilous halophyte: sea beach (Bic).
Temperate eastern American: Minn. to e. Que., southw. to Ga.

13. **V. adunca** Sm., var. **minor** (Hook.) Fernald. [Hsr] (*V. labradorica* Schrank; *V. adunca*, var. *glabra* Brainerd. *See* Fernald, Rhod. 51: 57. 1949.)

Sea cliffs (Bic; Prr.; Lbn.; Pcé.; Bon. I.); sea beaches (Bic; Car. (type station of var. *glabra*)); conifer woods (Bic; Rim.; Cld.; Prr.; Lou.; Pcé.; Bon. I.; Gnd.; Nou.; Mat.); cedar swamp (New Richmond); subalpine woods and slopes (Alb.; Tbl.; Mtt.; Ftn.); subalpine meadow (Log.); gravel outwash plain below Mt. Albert (R. du Diable).

(Arctic-)boreal American, alpine: B.C., Mack. (Great Bear L.), Hudson Bay, n. Lab., and Nfld., southw. in the mts. to Me., N.H., and N.Y.; Greenland.

14. **V. pubescens** Ait. [Hsr] Downy Yellow Violet

Woods (Bic; Rim.; Causapscal).

Temperate American: N. Dak. to e. Que., southw. in the mts. to Mo. and Va.

15. **V. pensylvanica** Michx., var. **leiocarpa** (Fern. & Wieg.) Fern. [Hs] (*V. eriocarpa* Schwein., var. *leiocarpa* Fern. & Wieg.; *See* Fernald, Rhod. 43: 616-617. 1941.) Stemmed Yellow Violet

Woods and thickets (Mtn.; Cap Chat; Ann.; Prr.; Drt.; Gnd.; Nou.; Mat.); rich woods at mountain foot (Nic.).

Temperate eastern American: Minn. to e. Que., southw. to Okla. and Md.

16. V. TRICOLOR L. [T] Garden Pansy

Sand flats near a burned stable (St. Tharsicius).

European: escaped from cultivation in temperate N.A., rarely persisting.

66. ELAEAGNACEAE

(Oleaster Family)

a. Flowers perfect; stamens 4; fruit dry and mealy, drupe-like; leaves alternate, elliptic to lanceolate, undulate, silvery-scurfy........................1. *Elaeagnus*

a. Flowers dioecious; stamens 8; fruit yellowish red, berry-like; leaves opposite, elliptical or ovate, nearly naked and green above, silvery-downy and scurfy with rusty scales beneath...2. *Shepherdia*

1. ELAEAGNUS (Tourn.) L.

(Silverbush)

1. **E. commutata** Bernh. [N] (*E. argentea* Pursh)

Calcicole: sea cliffs (Bic; Prr.; Pcé.); river ledges (Bon.).

Boreal American: Alaska, Yukon, Mack. (Great Slave L.), James Bay, and Que. (Isle of Orleans, Bic, Gaspe Peninsula), southw. to Utah, Colo., S. Dak., and nw. Minn.

2. SHEPHERDIA Nutt.

(Buffalo Berry)

1. **S. canadensis** (L.) Nutt. [N]

Calcicole: sea cliffs (Bic; Mét.; Trl.; Lou.; Prr.; Plr.; Val.; Lbn.; For.; Pcé.; Bon. I.; New Richmond); river ledges and gravels (Mtn.; Ann.; Gnd.; Bon.; PCa.; GCa.; Pab.); beach above high water (Bic; Car.); swampy soil (New Carlisle).

Boreal American: Alaska, Yukon, Mack. (Mack. R. Delta, Great Bear L.), middle Hudson Bay (w. and e. coasts), s. Lab., and Nfld., southw. to Oreg., Utah, N. Mex., Mich., Me., and n. N.Y.

67. LYTHRACEAE

(Loosestrife Family)

1. LYTHRUM L.

(Loosestrife)

1. L. SALICARIA L., var. TOMENTOSUM (Mill.) DC. [Hpr] Spiked Loosestrife

River shores (Drt.; Cha.); swampy pasture (Ste. Félicité).

European: naturalized in temperate eastern N.A.

68. ONAGRACEAE

(Evening Primrose Family)

a. Parts of the flowers in 2's, the flowers minute, white; fruit 1-2-seeded, bristly; leaves ovate, opposite...1. *Circaea*

a. Parts of the flowers in 4's.
  b. Flowers rose-colour, white or purplish; seeds silky-tufted; lower leaves often opposite ....2. *Epilobium*
  b. Flowers yellow; seeds naked; leaves alternate........................3. *Oenothera*

1. Circaea (Tourn.) L.

(Enchanter's Nightshade)

a. Fruit 1-celled, 1-1·5 mm. broad; calyx-lobes 0·8-1·2 mm. long; anthers 0·2-0·3 mm. long; leaves heart-shaped, thin, shining, coarsely toothed; stems 7-20 cm. high; rhizomes tuberous-thickened..1. *C. alpina*

a. Fruit 2-celled, 1·5-3 mm. broad; calyx-lobes 1·2-1·7 mm. long; anthers 0·5-0·8 mm. long; leaves thin, ovate, the middle and upper more or less cordate, the teeth salient; stems 10-50 cm. high; rhizomes slender....................2. *C. canadensis*

1. **C. alpina** L. [Grh]

Damp shaded rocks and slopes (Bic; Mét.; Grand Lac Matane; Trl.; Marsouins; Lou.; Drt.; Pcé.; GCa.; Mat.); subalpine woods (Bln.). General in its habitat.

Boreal circumpolar: Aleutian Is., Alaska, B.C., Alb., James Bay, Lab., and Nfld., southw. to Calif., Colo., S. Dak., Iowa, Ind., and mts. of Mass. and Ga.; Eurasia.

2. **C. canadensis** Hill. [Grh] (*C. intermedia* of Gray's Man., ed. 7.)

Rich woods (Drt.; New Carlisle; Nou.; Mat.).

Temperate eastern American: e. Que. and N.S., southw. to Mass. and N.Y.; with *C. intermedia* Ehrh., temperate circumpolar.

2. Epilobium L.

(Willow Herb. Fireweed)

a. Stigma deeply 4-lobed; corolla slightly irregular, the petals entire, 10-30 mm. long, widely expanding; calyx cleft almost to the ovary.
  b. Petals 10-15 mm. long; style pubescent at the base; veins of the leaves confluent in marginal loops; bracts small; stems erect.
    c. Leaves long-attenuate at apex.
      d. Plants 0·5-2 m. high; median cauline leaves 0·7-2 dm. long; mature inflorescences 1·7-7·5 dm. long; petals purple or rose-colour......1. *E. angustifolium*
      d. Plants low, 1-5 dm. high; median cauline leaves 3-7 cm. long; mature inflorescences 0·4-1·3 dm. long..........1a. *E. angustifolium*, var. *intermedium*
    c. Leaves merely acutish or bluntish........1b. *E. angustifolium*, var. *platyphyllum*
  b. Petals 15-30 mm. long; style glabrous; leaves pale, the lateral veins obsolete, not looped; bracts leaf-like; stems decumbent at base, 1-4 dm. high...2. *E. latifolium*

a. Stigma entire or only notched; corolla regular, the petals notched at the apex, 3-9 mm. long, usually not expanding beyond funnel-form; calyx-tube prolonged a little beyond the ovary.

b. Stems terete, without decurrent lines running down from the bases of the leaves; leaves linear to lanceolate, nearly entire, the margins revolute, generally without conspicuous lateral veins; seeds papillate, 1·5-2 mm. long.
  c. Capsules and stems greyish-velvety with fine spreading hairs; leaves 4-8 mm. wide; petals 7-9 mm. long..3. *E. strictum*
  c. Capsules and stems glabrous to crisp-pubescent with subappressed or inturned hairs.
    d. Upper part of stem and upper surface of leaves densely pubescent; tips of the stem or branches and buds before flowering arched or ascending; petals 4-6·5 mm. long..4. *E. leptophyllum*
    d. Upper part of stem and upper surface of leaves with scattered hairs, or becoming glabrous; stem-tips, and pedicels before flowering, nodding.
      e. Leaves thin, the middle ones 3-6 cm. long and 4-10 mm. wide. .5. *E. palustre*
      e. Leaves thickish, the middle ones 1-3 cm. long, 1·5-4 mm. wide...5a. *E. palustre*, var. *oliganthum*
b. Stems subterete, with decurrent lines running down from the bases of the leaves; leaves lanceolate to ovate, toothed (rarely entire), flat, the margins not revolute.
  c. Seeds smooth.
    d. Petals milk-white to rarely pinkish-tinged, 3-5 mm. long......6. *E. lactiflorum*
    d. Petals varying from lilac to purple, about 5 mm. long...........7. *E. alpinum*
  c. Seeds papillate.
    d. Stems solitary, the basal shoots (developing in late autumn) in the form of sessile or short-stalked rosettes; leaves short-petioled or subsessile.
      e. Flowers 6-9 mm. long; leaves crowded, not conspicuously decreasing in size into the crowded inflorescence..........................8. *E. glandulosum*
      e. Flowers 4-8 mm. long; leaves remote, conspicuously decreasing in size into the loose and open inflorescence.
        f. Median cauline leaves cordate-attenuate, ovate, conspicuously cordate at base ....8a. *E. glandulosum*, var. *cardiophyllum*
        f. Median cauline leaves ovate-lanceolate to narrowly lanceolate or oblong, rounded, barely subcordate or narrowed at base.
          g. Median leaves narrowly ovate or ovate-lanceolate ....8b. *E. glandulosum*, var. *adenocaulon*
          g. Median leaves elongate-lanceolate...8c. *E. glandulosum*, var. *occidentale*
    d. Stems more than one.
      e. Plants turioniferous (with scaly shoots from a subterranean bud); leaves 2·5-4 cm. long, rather acute, remote, erect; petals 3-4 mm. long, usually pale ....9. *E. Drummondii*
      e. Stolons or creeping rhizomes present; stems unbranched, ascending at base, at length often caespitose, crisp-pubescent in lines; leaves about 2·5 cm. long, mostly very obtuse, nearly entire; petals 5-8 mm. long, lilac to deep violet ....10. *E. Hornemanni*

1. E. angustifolium L. [Hp] Great Willow Herb. Fireweed

Clearings and roadsides (Bic; Mét.; Pcé.; Bon. I.; Causapscal); gravel beach (Bic); alpine meadows and wet slopes (Alb.; Tbl.). General.

Arctic circumpolar: Aleutian Is., Alaska, Yukon, Mack. (Mack. R. Delta, Great Bear L.), Keewatin, Hudson Str., s. and e. Baffin, n. Lab., and Nfld., southw. to Calif., Ariz., N. Mex., Tex., and N.C.; w. and e. Greenland; Iceland; Faeroes; arctic and alpine Eurasia.

Forma *albiflorum* (Dumort.) Haussk., with white petals and sepals (Rhod. 20: 4. 1918, key), has been collected at Sayabec in a large colony of normal plants, and at Rimouski.

Forma *spectabile* (Simmons) Fernald, with white petals and red sepals (Rhod. 20: 4. 1918, key), has been collected on Mt. Albert and Tabletop Mountain.

1a. **E. angustifolium,** var. **intermedium** (Wormsk.) Fernald, *See* Rhod. 20: 5. 1918.

Shores of alpine pond (Tbl.); alpine schists (Mtt.; Bln.).

Arctic American, alpine: n. coast of Alaska, Yukon, and Mack., n. Hudson Bay, Baffin, n. Lab., Nfld., and Gaspe; Greenland.

1b. **E. angustifolium,** var. **platyphyllum** (Daniels) Fernald, *See* Rhod. 20: 5. 1918.

Alpine meadows and cool gorges (Tbl.; Log.; Ftn.).

Disjunct American, alpine: B.C., Alb., and Sask., southw. to Nev., Utah, and N. Mex.; Minn.; Gaspe Peninsula.

2. **E. latifolium** L. [Ch (semi-shrubby)] Rydberg, p. 584.

Calcicole: sea cliffs (Bic); river gravels (Mtn.; Ann.; Mad.; Drt.; Yrk.; Jhn.; Bon.; GCa.); wet calcareous cliffs at mountain base (Col.); alpine cliffs (Mtt.).

Arctic circumpolar, alpine: Aleutian Is., n. coast of Alaska, Yukon, Mack. (Mack. R. Delta, Great Bear L., Coronation Gulf), Victoria I., Somerset I., Ellesmere, Devon, n. Baffin, Melville, n. Lab., and Nfld., southw. to James Bay and Gaspe, and in the mts. to Oreg. and Colo.; Greenland; Iceland; arctic and alpine Eurasia.

3. **E. strictum** Muhl. [Hpr] (*E. molle* Torr.; *See* Fernald, Rhod. 46: 377-386. 1944.)

Dried edge of marly pond (Lac Porc-Epic, Bic); river shore (Bon.); cedar swamp (New Richmond); grassy open meadow (Nou.).

Temperate American: Alb. to e. Que., southw. to Minn., Ill., and Va.

4. **E. leptophyllum** Raf. [Hpr]

Wet places (Bic; Dou.; New Carlisle; Bon.; Nou.); cedar swamp (New Richmond; Car.).

Temperate American: Alb. to e. Que., southw. to Colo., Ind., and Va.

Forma *umbrosum* (Haussk.) Fernald, a shade form with lax stem and flaccid leaves 5 mm. broad, has been collected at Bic and Maria.

5. **E. palustre** L. [Hpr] (*E. lineare* Muhl.; *See* Fernald, Rhod. 46: 377-386. 1944.)

Wet places (Bic; Mtn.; Bon. I.; New Carlisle; Mar.); river shores (Bon.); cedar swamps (New Richmond; Car.); alpine slopes (Alb.; Tbl.; Log.; Mtt.).

(Arctic-)boreal circumpolar, alpine: Alaska, Yukon, Mack. (Mack. R. Delta, Great Bear L.), Keewatin, Ungava Bay, n. Lab., and Nfld., southw. to Wash., Idaho, Colo., the Great Lakes, and Del.; e. Greenland; Iceland; Faeroes; arctic and alpine Eurasia.

Forma *labradorica* Haussk., with more divergent leaves, flowers solitary or few, strongly nodding, has been collected from alpine and subalpine habitats (Tbl.; Log.).

5a. **E. palustre,** var. **oliganthum** (Michx.) Fernald. (Has passed as var. *monticola* Haussk. of continental Europe; *See* Fernald, Rhod. 46: 379 (footnote). 1944.)

Boggy subalpine meadows (Tbl.; Ftn.; Mt. Bayfield).

Probably range of the species.

6. **E. lactiflorum** Haussk. [Hpr] (*E. alpinum* L., forma *lactiflorum* (Haussk.) Moore; *See* Rhod. 11: 147. 1909; 20: 36. 1918.)

Mossy alluvium of alpine brook (Alb.); wet slopes (Alb.; Tbl.; Log.; Mtt.; Ftn.; Mt. Bayfield).

Boreal circumpolar, alpine: Alaska, Yukon, and Mack., southw. in the mts. to Calif., Utah, and Colo.; east coast of Hudson Bay, James Bay, Lab., and Nfld., to mts. of Gaspe and N.H.; w. and e. Greenland; Iceland; Faeroes; arctic and alpine Eurasia.

7. **E. alpinum** L. [Hp] (*E. anagallidifolium* Lam.; *See* Moore, Rhod. 11: 141-147. 1909; Fernald, Rhod. 20: 36-39. 1918.)

Mossy alluvium of an alpine brook (Alb.); wet alpine slopes (Alb.; Tbl.).

Arctic circumpolar, alpine: Alaska, Yukon, Mack., Victoria I., southw. in the mts. to Colo.; e. coast of Hudson Bay, s. Baffin, Akpatok I., n. Lab., and Nfld., and mts. of Gaspe and Me.; w. and e. Greenland; Iceland; Faeroes; arctic and alpine Eurasia.

8. **E. glandulosum** Lehm. [Hp] *See* Fernald, Rhod. 20: 31-36. 1918.

Calcicole: sea cliffs and ridges (Bic; Rim.; Prr.; Clr.; For.; Pcé.; Bon. I.).

Boreal American: Aleutian Is., Alaska, Sask., and Wash., southw. in the mts. to Oreg.; s. James Bay and e. Que. to Lab. and Nfld., southw. to the Great Lakes; e. Asia; introduced into Europe.

8a. **E. glandulosum,** var. **cardiophyllum** Fernald, Rhod. 20: 35. 1918. (Including specimens distributed as *E. boreale* Haussk.)

Subalpine conifer woods (Tbl.; Log.; Mtt.; Ftn.; Col.).

Gulf endemic: Gaspe, s. Lab., Nfld.

8b. **E. glandulosum,** var. **adenocaulon** (Haussk.) Fernald, *See* Rhod. 20: 31-36. 1918.

Calcicole: sea ridges (Bic); river shores (Ann.; Bon.; Mat.); railway ballast (Bic); wet places (Mét.; R. Blanche; Pcé.; New Carlisle; New Richmond; Nou.).

Boreal American: central Alaska, Yukon, Mack. (Great Slave L.), James Bay, n. Que., and Nfld., southw. to Oreg., Nev., N. Mex., Mo., Ohio, and Pa.; introduced into Europe.

8c. **E. glandulosum,** var. **occidentale** (Trelease) Fernald, *See* Rhod. 20: 35. 1918.

Wet ground (Bic; Pcé.; Drt.; Gnd.; New Carlisle; Bon.; Nou.); cedar swamp (New Richmond).

Disjunct American: B.C. to Alb., southw. to Calif. and Colo.; e. Que.

9. **E. Drummondii** Haussk. [Hp] Rydberg, p. 588.

Alpine schists (Log.); subalpine meadow (Tbl.).

Disjunct American, alpine: B.C. to Sask., southw. to Utah and N. Mex.; Gaspe, n. Lab., and Nfld.

10. **E. Hornemanni** Reich. [Hpr] (*See* Moore, Rhod. 11: 141-147. 1909.)

Damp woods (Lou.; Trl.); river ledges and alluvium (Cap Chat; Ann.; Yrk.; Gnd.; PCa.; GCa.); beach (Srl.); wet calcareous soil (Pcé.); schistose talus (Mtt.); wet alpine slopes (Alb.; Tbl.; Log.; Lyl.; Bln.).

Boreal circumpolar, alpine: Aleutian Is., Alaska, Yukon, James Bay, Lab., and Nfld., southw. in the mts. to Calif., Utah, and N.H.; Greenland; Iceland; arctic and alpine Eurasia.

3. OENOTHERA L.

(Evening Primrose)

a. Stamens unequal; pods obscurely glandular-puberulent, clavate, 6-12 mm. long, winged; flowers opening in the sunlight; stems strigose-puberulent, 10-50 cm. high...1. *O. perennis*

a. Stamens equal; pods wingless, not clavate; flowers opening toward evening; stems 7-20 dm. high.

  b. Stems and capsules almost glabrous; petals about 2·6 cm. long......2. *O. Victorinii*

  b. Stems and capsules hairy, the hairs with enlarged reddish tuberculate bases.

    c. Petals 18-20 mm. long; pods up to 6 cm. long; stems arising obliquely from the ground, strongly recurved at summit......................3. *O. ammophiloides*

    c. Petals 10-16 mm. long; pods 2·5-4 cm. long; tips of stems and branches curved.

      d. Petals 10-13 mm. long; basal leaves bluish green, narrowly elliptic...4. *O. parviflora*

      d. Petals up to 16 mm. long; basal leaves greyish green, narrowly oblanceolate...5. *O. parva*

1. **O. perennis** L. [Hs] (*O. pumila* L.) Sundrops

Dry slaty field (Bic); railway ballast (Bic); damp field (Rim.); road in woods (Ann.); gravelly and sandy river banks (Mat.); habitat not stated (Mét.; Zén.).

(Boreal-)temperate American: Man. to Nfld., southw. to Kans. and Ga.

2. **O. Victorinii** Gates & Catcheside, Journ. Linn. Soc. 49: 182. 1933. [Hs]

Sandy river flats (Mat.).

Quebec endemic: region of Montreal; Gaspe.

3. **O. ammophiloides** Gates & Catcheside, Journ. Linn. Soc. 49: 180. 1933. [Hs]

Dry slaty fields (Bic; Rim.).

Temperate eastern American: Que. and N.S.

4. **O. parviflora** L. [Hs] (*O. muricata* L.) Common Evening Primrose

River gravels (Ann.; Cld.; Drt.; Yrk.; Jhn.; PCa.; GCa.; Mat.); talus of sea cliffs (Cld.; Prr.; Plr.; Manche d'Epée; Lbn.); sandy sea beaches (Bic; R. Blanche; Mét.; Mtn.; Pén.; Pas.; New Carlisle; Car.); roadside (Val.); railway ballast (Bic; Mat.).

(Boreal-)temperate American: Sask. to Nfld., southw. to Colo. and N.Y.

5. **O. parva** Gates, Phil. Trans. Roy. Soc., London, ser. B, 226: 296. 1936. [Hs]

"By an old wharf" (Bic).

Quebec endemic: L'Islet co. to Rimouski co.

69. HALORAGIDACEAE

(Water Milfoil Family)

a. Leaves linear, entire; stamen 1; fruit nut-like, 1-celled, 1-seeded; stems simple ... .1. *Hippuris*

a. Leaves pinnately dissected; stamens 4-8; fruit 4-celled, 4-lobed......2. *Myriophyllum*

1. HIPPURIS L.

(Mare's-tail)

a. Leaves linear or lanceolate, relatively rigid, in verticels of 5-12........1. *H. vulgaris*

a. Leaves obovate, oblong or oblanceolate, in verticels of 4-6........................ ....1a. *H. vulgaris*, var. *maritima*

1. **H. vulgaris** L. [Hel]

River flats (Drt.; Pab.); swampy stream (Val.); edge of lake (Lac Ste. Anne).

Halophyte: mud flats at river mouths (Mad.; Bon.; PCa.); brackish pools (Bnc.).

Arctic circumpolar: Aleutian Is., Alaska, Yukon, Mack. (Mack. R. Delta, Great Bear L., Coronation Gulf), Victoria I., Hudson Bay (Chesterfield Inlet, Southampton I., Hudson Str.), n. and s. Baffin, n. Que., n. Lab., and Nfld., southw. to Calif., N. Mex., Nebr., Ill., Ind., and N.Y.; w., n., and e. Greenland; Iceland; arctic Eurasia.

Forma *fluviatilis* (Coss. & Germ.) Gluck, a sterile plant with flaccid, very elongated leaves and entirely submersed stem, has been collected from marly ponds (Tng.; Oie; Zén.) and a subalpine lake (Lac Ste. Anne). The emersed and submersed types of leaves may both be present on the same stem.

1a. **H. vulgaris,** var. **maritima** Hartm. (*H. tetraphylla* L. f.)

Halophyte: mud flats at river mouths (Mtn.; Ann.; Drt.; Yrk.).

Range of the species, but more southern.

2. MYRIOPHYLLUM (Vaill.) L.

(Water Milfoil)

a. Flowers solitary in the axils of submersed unmodified foliage leaves; stamens 4; petals rather persistent; fruit 2-2·5 mm. long, the flat-sided carpels with 1-2 prominently tuberculate dorsal ridges..............................1. *M. Farwellii*

a. Flowers in terminal emersed interrupted spikes, the bracts smaller than the flowers; stamens 8; petals early deciduous; carpels smooth.

  b. Bracts alternate, mostly entire or nearly so; flowers solitary or in pairs; leaves 5-12 mm. long, the rhachis and segments capillary........................... .... 2. *M. alterniflorum*, var. *americanum*

  b. Bracts and flowers verticillate; leaves 1-4 cm. long.

    c. Bracts pinnatifid or pectinate; rhachis of the leaves slightly broader than the divisions; stigmas prominent, recurved.......................3. *M. verticillatum*

    c. Bracts entire or denticulate; rhachis about the width of the divisions; stigmas obscure...4. *M. exalbescens*

1. **M. Farwellii** Morong. [HH]

Pond (Canton Leclercq, Matane co.); subalpine lakes (Tbl.).

Temperate eastern American: Minn. to e. Que., southw. to N.Y. and N.H.

2. **M. alterniflorum** DC., var. **americanum** Pugsley, Journ. Bot. 76: 51-53. 1938. [HH]

Marly ponds (Lac du Club, Matane co.; Tng.; Lac des Sept Iles, Cha.).

Boreal American: Alaska, Mack. (n. coast and Great Bear L.), n. Sask., James Bay, Côte Nord, and Nfld., southw. to Minn., Wis., Ohio, and Conn.; with the species, boreal circumpolar.

3. **M. verticillatum** L. [HH]

River waters (Drt.; PCa.).

Boreal circumpolar: B.C. to s. James Bay and Nfld., southw. to Utah, Ill., and N.Y.; Iceland; Eurasia.

4. **M. exalbescens** Fernald, Rhod. 21: 120. 1919. [HH] (*M. spicatum* of Gray's Man., ed. 7; *M. spicatum*, subsp. *exalbescens* (Fern.) Hultén, Fl. Alaska and Yukon 7: 1159. 1948.)

River waters (Rim.; Drt.; Yrk. (type station); GCa.).

Boreal American: Alaska, Yukon, Mack. (Mack. R. Delta, Great Bear L.), Hudson Bay (Churchill), Lab., and Nfld., southw. to Calif., Ariz., N. Mex., Kans., Ind., and N.J.; w. Greenland; closely related to the Eurasian *M. spicatum* L.

70. ARALIACEAE

(Ginseng Family)

1. Aralia (Tourn.) L.

(Sarsaparilla)

a. Umbels in a narrow panicle, on a zigzag leafy stem; leaves very large, decompound .... 1. *A. racemosa*

a. Umbels arranged subumbellately, on a naked scape; leaves basal, ternate and pinnate; plant glabrous .... 2. *A. nudicaulis*

a. Umbels arranged subcorymbosely; stem strict, leafy, often prickly at base; leaves 2-pinnate .... 3. *A. hispida*

1. **A. racemosa** L. (Hpr) American Spikenard

Woods (La Couronne, Rimouski co.; Car.; Res.).

Temperate eastern American: Minn. to e. Que., southw. to S. Dak., Mo., and Ga.

2. **A. nudicaulis** L. (Hpr) Wild Sarsaparilla

Woods and cliffs (Bic; Rim.; Mét.; Grand Lac Matane; Drt.; Yrk.; Irn.); subalpine woods (Alb.; Mtt.; Bln.). General in its habitat.

Boreal American: Mack., n. Alb., n. Sask., Man., James Bay, Côte Nord, and Nfld., southw. to Idaho, Colo., Mo., and Ga.

3. **A. hispida** Vent. [Ch (semi-shrubby)] Bristly Sarsaparilla

Dry fields and river flats (Bic; Rim.; Plr.; Pén.; Drt.; Yrk.; Cha.; Zén.). General.

Boreal eastern American: Hudson Bay to Mingan Is. and Nfld., southw. to Minn., Ind., W. Va., and N.C.

71. UMBELLIFERAE

(Parsley Family)

a. Flowers yellow; involucre none; fruit with filiform dorsal ribs, thin wings, and solitary oil-tubes in the intervals; leaves 1-pinnate, the leaflets coarse, cut toothed; stem grooved..........1. *Pastinaca*

a. Flowers white, greenish or pink.
- b. Fruit covered with bristles or prickles.
  - c. Fruit not flattened; oil-tubes 5; leaves palmately 3-7-parted..........2. *Sanicula*
  - c. Fruit flattened.
    - d. Leaves ternately compound; fruit attenuate at base; oil-tubes obsolete..........3. *Osmorhiza*
    - d. Leaves pinnately compound, finely divided; oil-tubes present; umbels usually concave in fruit; central floret dark purple..........5. *Daucus*
- b. Fruit smooth, ribbed or winged.
  - c. Fruit not flattened; ribs prominent, wingless.
    - d. Flowers white; oil-tubes 2-6 in the intervals; leaves fleshy, glabrous, shining, mostly 2-ternate..........4. *Ligusticum*
    - d. Flowers greenish white; oil-tubes solitary in the intervals and under the ribs; leaves large, puberulent, 2-3 ternate..........6. *Coelopleurum*
  - c. Fruit dorsally flattened, winged, at least on the lateral ribs.
    - d. Leaves decompound into linear-oblong acutish segments, glabrous; oil-tubes 1-3 in the intervals; wings nearly as broad as the seed; involucre few-leaved or none..........7. *Conioselinum*
    - d. Leaves ternately or pinnately compound, with broad segments.
      - e. Segments ovate or oval, not cordate; stylopodium depressed......8. *Angelica*
      - e. Segments large, cordate; stylopodium thick, conic; oil-tubes 1 in each interval, conspicuous, obclavate, extending only to about the middle of the carpels; petioles much inflated; plant very stout, woolly........9. *Heracleum*
  - c. Fruit laterally flattened, ovoid or oval, wingless.
    - d. Leaves 1-pinnate, the lower sometimes submersed and finely dissected; oil-tubes 1-3 in the intervals between the prominent, corky, nearly equal ribs; stylopodium depressed..........10. *Sium*
    - d. Leaves decompound; oil-tubes solitary or none.
      - e. Stylopodium depressed; ribs flattish, corky, the lateral largest; oil-tubes conspicuous, solitary in the intervals..........11. *Cicuta*
      - e. Stylopodium conical and prominent; ribs equal, filiform; oil-tubes none; leaves biternate, the leaflets ovate, variegated with white....12. *Aegopodium*
      - e. Stylopodium short-conical; ribs filiform, inconspicuous; oil-tubes solitary in the intervals; leaflets much dissected into filiform divisions....13. *Carum*

1. Pastinaca L.

(Wild Parsnip)

1. P. SATIVA L. [Hs]

Gravelly beach of spit (Car.); fields (Lou.; New Carlisle; Nou.).

European: naturalized throughout temperate N.A.; West Indies. The juice of this plant is poisonous to the skin of some people (*See* Hoffmann, Rhod. 4: 188. 1902).

2. Sanicula (Tourn.) L.

(Black Snakeroot. Sanicle)

a. Styles much exceeding the bristles of the fruit, recurved; leaf segments 5-7, firm, bluish green.
- b. Sepals 1-1·5 mm. long; pedicels filiform, somewhat elongate; fruits averaging 5-7 mm. long..........1. *S. marilandica*

b. Sepals 1·3-2 mm. long; pedicels thickened and shorter; fruit 6-8 mm. long..1a. *S. marilandica*, var. *borealis*

a. Styles shorter than the bristles of the fruits; leaf segments generally 3, the lateral ones often cleft, thin, rather bright green ....2. *S. trifoliata*

1. **S. marilandica** L. [Hs]

Talus of sea cliffs (Bic; Prr.); fields (Ren.).

(Boreal-) temperate American: B.C. to Nfld., southw. to N. Mex., Colo., and Ga.

1a. **S. marilandica,** var. **borealis** Fernald, Rhod. 28: 220. 1926.

Alluvial thickets and conifer woods (Bic; Mét.; Mtn.; Ann.; Val.; Tng.; Ren.; Drt.; Jhn.; Gnd.; Bon.; PCa.).

Boreal eastern American: s. James Bay to Nfld., southw. to N.Y.

2. **S. trifoliata** Bickn. [Hs]

Habitat not stated (Gpe.).

Temperate eastern American: Minn. and Ont. to e. Que., southw. to Tenn., and in the mts. to N.C.

3. Osmorhiza Raf.
(Sweet Cicely)

[Constance and Shan: The genus Osmorhiza (Umbelliferae); Univ. Calif. Publ. Bot. 23: 111-155. 1948.]

a. Involucel conspicuous; stylopodium conic.
  b. Style and stylopodium 2-4 mm. long; stems essentially glabrous except at the nodes; stipules densely pilose on the margin; plants anise-scented..1. *O. longistylis*
  b. Style and stylopodium 1-1·5 mm. long; stems villous-pubescent; stipules ciliate-hispid; plants not anise-scented.....................................2. *O. Claytoni*

a. Involucel lacking or rudimentary.
  b. Style and stylopodium 0·3-1 mm. long, the latter conic; rays and pedicels spreading-ascending; fruit cylindric, tapering at the apex, 12-27 mm. long......3. *O. chilensis*
  b. Style and stylopodium about 0·5 mm. long, the latter low-conic or depressed; rays and pedicels divaricate; fruit clavate, obtuse, the enlarged part 8-12 mm. long ....4. *O. obtusa*

1. **O. longistylis** (Torr.) DC. [Hs]

Woods near river (Mat.).

Temperate American: Alb. and Mont. to Ont. and e. Que., southw. to N. Mex., Tex., Okla., Ala., and Ga.

2. **O. Claytoni** (Michx.) Clarke. [Hs]

Conifer woods (Rim.; Prr.; GCa.; Nou.); subalpine woods (Mt. Nicolabert).

Temperate eastern American: isolated in sw. Sask.; Minn. to s. Ont. and Cape Breton I., southw. to Ark., Ala., and N.C.

3. **O. chilensis** Hook. & Arn. [Hs] (*O. divaricata* Nutt.)

Conifer woods (Bic; Srl.; Prr.; Gpe.; Dou.; Pcé.; Gnd.; Bon.; PCa.; GCa.; Car.; Res.); sea cliffs (Ren.); subalpine woods (Mtt.).

Disjunct American: Aleutian Is., s. Alaska, B.C., and s. Alb. to s. Calif., Ariz., Colo., and w. S. Dak.; Great Lakes region; e. Que., Anticosti I., and Nfld. to N.H. and N.S.; Chile and Argentina.

4. **O. obtusa** (Coult. and Rose) Fernald. [Hs]

Conifer woods (Bic; Rim.; Mét.; Srl.; Lou.; Plr.; Ren.; Yrk.; Pcé.; Gnd.; Bon.; PCa.; GCa.; Car.; Nou.); subalpine conifer woods (Alb.; Tbl.; Log.; Mtt.; Lyl.).

Disjunct American: s. Alaska and Alb. (isolated in Sask.) to n. Calif., s. Nev., Ariz., and N. Mex.; Great Lakes region; e. Que., Anticosti I., s. Lab. (Capitan I.), and Nfld.; isolated on Mt. Mansfield, Vt.; Chile and Argentina.

4. LIGUSTICUM L.

(Lovage)

1. **L. scothicum** L. [Hs] Scotch Lovage

Psammophilous halophyte: seashore sands and ledges within reach of spray (Bic; Mét.; Baie des Sables; Ann.; Trl.; Manche d'Epée; Tng.; For.; Pén.; Pcé.; Bon.; Pte. à la Garde).

Amphi-Atlantic (maritime): James Bay; e. Que. to Lab. and Nfld., southw. along the coast to N.Y.; coasts of s. Greenland, Iceland, the Faeroes, the British Isles, and Scandinavia; closely related to *L. Hultenii* Fernald of s. Alaska and e. Asia (*See* Rhod. 32: 7. 1930).

5. DAUCUS (Tourn.) L.

(Wild Carrot)

1. D. CAROTA L. [Hs] Queen Anne's Lace

Roadside (Yrk.).

Eurasian: naturalized throughout temperate N.A.

6. COELOPLEURUM Ledeb.

(Seacoast Angelica)

1. **C. lucidum** (L.) Fernald. [Hs] (*Angelica lucida* L.)

Gravelly shores and seaside thickets (Bic; Rim.; Trl.; Mrn.; Tng.; Pcé.; Bon.; Car.; Nou.; Esc.); subalpine slopes (Log.; Pem.; Ftn.).

Disjunct American: Alaska to n. Calif.; James Bay; e. Que. to s. Lab. and Nfld., southw. to N.Y.; Greenland; e. Asia.

7. CONIOSELINUM Fisch.

(Hemlock Parsley)

1. **C. chinense** (L.) BSP. [Hs]

Calcicole: sea cliffs and talus (Bic; Ste. Luce; Mét.; Ann.; Trl.; Srl.; Cld.; Prr.; Plr.; Ros.; Pcé.; Gnd.; Mat.); alpine cliffs (Alb.; Tbl.; Ftn.; Pem.; Bln.); subalpine meadow (Log.). Plants distributed as *C. Gmelini* (Bray) Steud. (*See* Fernald, Rhod. 28: 221. 1926) are not separated here.

Boreal eastern American, alpine: Minn. to Lab. and Nfld., southw. to Ind. and N.Y., and in the mts. to N.C.

8. ANGELICA L.
(Angelica)

a. Seeds adherent to the pericarp; oil-tubes mostly 1 in the intervals; uppermost leaves mostly reduced to large inflated petioles..............................1. *A. sylvestris*

a. Seeds loose; oil-tubes 25-30; upper petioles not so prominent......2. *A. atropurpurea*

1. A. SYLVESTRIS L. [Hs]

Gravels of spit (Bon.).

European: Adventive in temperate eastern N.A.

2. **A. atropurpurea** L. [Hs]

Alluvial soils (Bic; Cap Chat; Trl.; Srl.; Marsouins; Drt.; Bon.; PCa.; GCa.); subalpine brook (Mtt.).

Boreal eastern American: Minn. to s. James Bay, Lab., and Nfld., southw. to Ill. and Del.

9. HERACLEUM L.
(Cow Parsnip)

1. **H. lanatum** Michx. [Grt]

Roadsides and banks of streams (Bic; Mét.; Mat.); subalpine slopes (Alb.; Tbl.). General.

Boreal American: Aleutian Is., Alaska, s. Yukon, Mack., s. Hudson Bay, Lab., and Nfld., southw. in the mts. to Calif., Utah, Kans., Nev., and Ga.; e. Asia (Siberia and Kurile Islands).

10. SIUM (Tourn.) L.
(Water Parsnip)

1. **S. suave** Walt. [Hel] (*S. cicutaefolium* Schrank)

Wet places (Bic; Rim.; Bnc.; Gnd.; Bon.; Cha.; Nou.; Esc.).

Boreal American: B.C. and Mack. (Great Slave L.) to s. James Bay and Nfld., southw. to Calif., Nev., Utah, Colo., Tex., La., and Fla.; e. Asia.

11. CICUTA L.
(Water Hemlock)

a. Fruit 3-3·5 mm. long; no bulblets in the axils of the leaves; leaflets lanceolate to oblong, acuminate; stems stout, streaked with purple.................1. *C. maculata*

a. Fruit scarcely 2 mm. long; leaflets linear; upper axils bearing clustered bulblets; stems slender, 3-10 dm. high...2. *C. bulbifera*

1. **C. maculata** L. [Hs] Water Hemlock

Swampy soil (Bic; Lou.; Drt.; Dou.; Pcé.; Gnd.; Cha.; Bon.; GCa.; Pas.; Car.; Nou.); salt marsh (Cap.). General in its habitat.

Boreal American: central Alaska to s. James Bay and e. Que., southw. to N. Mex., Tex., and Fla.

2. **C. bulbifera** L. [Hs] Bulb-bearing Water Hemlock

Swampy soil (Bic; Drt.; Bon. I.; Cha.; Dan.; Bon.; Oie; Mar.; Nou.). General in its habitat.

Boreal American: B.C. to s. James Bay, Mingan Is., and Nfld., southw. to Tex. and Fla.

12. AEGOPODIUM L.
(Goutweed)

1. A. PODOGRARIA L., var. VARIEGATUM Hort. [Hs]

Roadside by garden (Mat.).

European: adventive in temperate N.A.

13. CARUM L.
(Caraway)

1. C. CARVI L. [Hs]

Wet places (Beauséjour); railway ballast (Bic); gravelly bank (Mat.); limestone detritus (Pcé.).

European: naturalized throughout temperate N.A.

Forma *rhodochranthum* A. H. Moore, with pink rather than white flowers (*See* Rhod. 11: 178. 1909), has been collected from the roadside at Percé.

72. CORNACEAE
(Dogwood Family)

1. CORNUS (Tourn.) L.
(Cornel. Dogwood)

a. Flowers capitate, with an involucre of 4(-6) large, ovate, petaloid white bracts; fruit bright red; low herbaceous plants with slender rootstocks.
  b. Petals greenish white; leaves scarcely petioled, the upper crowded into an apparent whorl, the lower scale-like; veins pinnate........................1. *C. canadensis*
  b. Petals purple or purple-tipped; leaves all opposite, in 3-several pairs, the veins all arising from near the base; involucral bracts obtusish..............2. *C. suecica*

a. Flowers white, in open, spreading, flat cymes; involucre none.
  b. Leaves alternate, clustered at the ends of the greenish white-streaked branches, white and minutely pubescent beneath; fruit deep blue, on reddish stalks...3. *C. alternifolia*
  b. Leaves opposite.
    c. Leaves round-oval, abruptly pointed, thinly woolly beneath; branches olive or pale green or suffused with purple, warty-dotted; fruit light blue.....4. *C. rugosa*
    c. Leaves ovate, rounded at base, abruptly pointed, minutely pubescent on both sides, whitish beneath; branches, especially the osier-like shoots of the season, bright red-purple, smooth; fruit white or lead-colour............5. *C. stolonifera*

1. **C. canadensis** L. [Hpr] Bunchberry. Dwarf Cornel

Conifer woods (Bic; Baie des Sables; Mét.; Mtn.; Gnd.; Dou.; Mat.); subalpine conifer woods (Alb.; Tbl.; Log.). General in its habitat.

Boreal American: Aleutian Is., Alaska, Yukon, Mack. (Great Bear L., Great Slave L.), middle Hudson Bay (w. and e. coasts), n. Lab., and Nfld., southw. to Calif., N. Mex., S. Dak., Ind., and N.J., and in the mts. to Ky. and W. Va.; s. Greenland; ne. Asia.

Forma *purpurascens* (Miyabe & Tatewaki) Hara, with deep pink or rose-purple involucral bracts (*See* Rhod. 43: 156. 1941; 44: 20. 1942), has been collected on open alpine slopes of Mt. Mattaouisse (the type station of forma *rosea* Fernald).

Forma *elongata* Peck, Bull. N.Y. State Museum 150: 44. 1910, with a pair of opposite leaves at each of three or four nearly equidistant nodes (in this character resembling *C. suecica*, but the leaves pinnately veined), has been reported from several localities (Bic; Log.; Mtt.) as the western *C. canadensis*, var. *intermedia* Farr.

2. **C. suecica** L. [Hpr] Northern Dwarf Cornel

Calcicole: sea cliffs and ridges (Bic; Sacré-Cœur; Val.; Newport).

Boreal ?circumpolar: Aleutian Is. and Alaska to B.C.; Lab. and Nfld., southw. to e. Que.; w. and e. Greenland; Iceland; Faeroes; n. Europe; e. Asia.

3. **C. alternifolia** L. f. [N-M] Alternate-leaved Dogwood

Thickets (Rim.; Cap Chat; Ann.; Marsouins; Prr.; Lou.; Pcé.; Mal.; Mat.).

(Boreal-)temperate eastern American: Minn. to Nfld., southw. to Mo., Ala., and Ga.

4. **C. rugosa** Lam. [M] (*C. circinata* l'Hér.) Roundleaf Dogwood

Thickets (Bic; Rim.; Prr.; Lac Pleureuse; Pcé.; Car.; Nou.; Res.).

Temperate American: Man. to e. Que., southw. to N. Dak., Iowa, Ill., Ind., and Va.

5. **C. stolonifera** Michx. [N-M] (*C. sericea*, forma *stolonifera* (Michx.) Fosberg; *See* Bull. Torrey Bot. Club 69: 587. 1942.) Red Osier Dogwood

Sea cliffs (Bic; Rim.; Mét.; Gro.; Srl.; Prr.; Plr.; Lbn.; For.); river gravels (Mtn.; Yrk.; Gnd.; Bon.; PCa.; Mat.); roadside thickets (Bic); subalpine thickets (Alb.; Tbl.).

Boreal American: Alaska, Yukon, Mack. (Great Bear L.), James Bay, s. Lab., and Nfld., southw. to Calif., Ariz., N. Mex., Nebr., Iowa, Ky., and Va.

73. ERICACEAE

(Heath Family)

a. Ovary superior.
  b. Plants saprophytic, without green colour; anthers dehiscing by vertical or transverse, often terminal, slits; pollen grains simple; fruit a capsule....................1. Subfamily *MONOTROPOIDEAE*
  b. Plants with green foliage; pollen grains compound.
    c. Anthers inverted, dehiscing by basal (apparently apical) pores; corolla polypetalous; fruit a capsule; low evergreen herbs.....2. Subfamily *PYROLOIDEAE*
    c. Anthers erect, dehiscing by apical pores, rarely by vertical slits; corolla gamopetalous, rarely polypetalous; fruit a capsule or berry; erect or prostrate shrubs....................3. Subfamily *ERICOIDEAE*

a. Ovary inferior, adnate to the calyx, forming a many-seeded berry or drupe in fruit; corolla gamopetalous; pollen grains compound; erect or trailing shrubs....................4. Subfamily *VACCINIOIDEAE*

1. Subfamily MONOTROPOIDEAE

a. Corolla polypetalous, deciduous, with connivent petals; anthers peltate, opening across the top, awnless, becoming 1-celled....................1. *Monotropa*

a. Corolla gamopetalous, persistent, ovoid or subglobose; anthers vertically dehiscent, 2-awned on the back, 2-celled....................2. *Pterospora*

2. Subfamily PYROLOIDEAE

a. Leaves wedge-lanceolate, sharply serrate, shining, scattered; flowers corymbose or umbellate; style very short and top-shaped; stigma peltate, 5-crenate; capsule dehiscent from above downward, the valves with smooth edges.........3. *Chimaphila*

a. Leaves suborbicular or elliptical, basal; style long.
  b. Flowers racemose; petals concave and more or less converging; capsule dehiscent from below upward, the edges of the valves connected by cobwebby threads...4. *Pyrola*
  b. Flowers solitary; stigma peltate, with 5 narrow and conspicuous lobes; capsule dehiscent from above downward, the valves with smooth margins.......5. *Moneses*

3. Subfamily ERICOIDEAE

a. Fruit a septicidal capsule (dehiscing through the partitions and between the cells); anthers unappendaged.
  b. Corolla of separate petals; flowers white, in terminal umbel-like clusters; leaves clothed with rusty wool beneath, the margins revolute; low shrubs......6. *Ledum*
  b. Corolla of partly united petals.
    c. Anther-sacs opening lengthwise; corolla campanulate, white or rose colour; stamens 5; capsule 2-3-celled; leaves crowded, dark green above, paler beneath, 4-8 mm. long, the lower midrib very prominent, the margins strongly revolute; tufted evergreen plants...7. *Loiseleuria*
    c. Anther-sacs opening by pores.
      d. Corolla decidedly 2-lipped, the upper lip 3-lobed at apex, the lower one with 2 long narrow lobes, purplish rose colour, up to 2 cm. long; leaves deciduous, appearing with or after the flowers...............................8. *Rhodora*
      d. Corolla not 2-lipped.
        e. Flower-buds and leaf-buds scaly-strobilaceous; corolla rotate-campanulate, purple and somewhat mottled, about 1 cm. long; leaves elliptic, obtuse, dotted like the branches with rusty scales; prostrate shrubs...9. *Rhododendron*
        e. Flower-buds and leaf-scales not scaly-strobilaceous.
          f. Corolla cylindric-urn-shaped, 5-toothed, purplish, 7-8 mm. long; pedicels erect, very glandular; leaves yew-like, rough-margined......10. *Phyllodoce*
          f. Corolla saucer-shaped, 10-saccate, 5-lobed, the lobes rounded, crimson or rose-purple; leaves oblong, entire; smooth shrubs..............11. *Kalmia*

a. Fruit a loculicidal capsule (dehiscing through the middle of the back of each cell) or a berry; anthers awned or awnless.
  b. Fruit a dry capsule.
    c. Leaves subulate, 2-4 mm. long; corolla campanulate, white or rose colour; flowers nodding, on slender, erect, terminal peduncles; anthers fixed nearly at the apex, bearing a long recurved awn behind; plants low and moss-like, tufted and procumbent...12. *Cassiope*
    c. Leaves linear to broadly oval, longer, mostly obtuse; corolla urceolate to cylindrical; erect or prostrate shrubs.
      d. Anther-sacs opening by a terminal pore or chink.
        e. Calyx-lobes imbricate; corolla oblong-cylindric, narrowed at the throat; anther-sacs tapering upward into tubular beaks, awnless; flowers white, in the axils of the upper small leaves, forming small 1-sided leafy racemes; leaves oblong or oblanceolate, densely covered on both sides with minute scurfy scales..13. *Chamaedaphne*
        e. Calyx-lobes valvate; corolla rose-colour, globose-urceolate; anthers awned on the back; flowers in closer clusters, the bracts not leaf-like; leaves linear to narrowly oblong, white beneath with close fine pubescence...14. *Andromeda*
      d. Anther-sacs opening lengthwise, awnless; corolla salverform, rose-colour, the tube 10-16 mm. long, hairy inside; leaves oval to suborbicular, cordate, leathery, reticulate-veined; trailing shrubs, bristly with rusty hairs...15. *Epigaea*

b. Fruit berry-like.

c. Leafy branches small and erect; flowers mostly single in the axils; anthers 4-awned..16. *Gaultheria*

c. Leafy branches prostrate; flowers scaly-bracted, in terminal clusters; anthers 2-awned..17. *Arctostaphylos*

4. Subfamily VACCINIOIDEAE

a. Corolla cylindric or urceolate; anthers not exserted.

b. Berries blue, bluish black, or red; ovary wholly inferior; anthers awned or awnless; leaves deciduous (persistent in *V. Vitis-Idaea*); erect or depressed shrubs........ ....19. *Vaccinium*

b. Berries snow-white; ovary half inferior; anther-sacs awnless, but minutely 2-pointed at apex, opening by a large chink down to the middle; leaves small, evergreen, ovate and pointed, with revolute margins, smooth above, the lower surface and the branches beset with rigid rusty bristles..........................18. *Chiogenes*

a. Corolla rotate, deeply 4-parted, the lobes reflexed; anthers exserted, produced into long tubes, awnless; pedicels erect, the pale rose-coloured flowers nodding; berries red, acid; leaves small, entire, whitened beneath, evergreen; stems slender, creeping or trailing..20. *Oxycoccus*

1. Monotropa L.

a. Flowers solitary, terminal; style very short and broad; plants smooth, waxy-white, turning blackish in drying..1. *M. uniflora*

a. Flowers racemose; style longer than the ovary; plants somewhat pubescent or downy, crimson or yellowish..................................2. *M. Hypopithys,* var. *rubra*

1. **M. uniflora** L. [Gr] Indian Pipe

Conifer woods (Bic; Grand Lac Matane; Prr.; For.; Dou.; Pcé.; Gnd.; Car.); subalpine conifer woods (Alb.; Tbl.; Log.; Str.; Bln.).

Boreal American: s. Alaska and Mack. to James Bay and Nfld., southw. to n. Calif., Mex., and Fla.; Asia (India to Japan).

2. **M. Hypopithys** L., var. **rubra** (Torr.) Farw. [Gr] (*M. Hypopitys* of Gray's Man., ed. 7; *See* Farwell, Amer. Midland Nat. 10: 39. 1926.) Pinesap

Conifer woods (Bic; Cap Chat; Ann.; Lou.; Mad.; Gnd.; Car.); subalpine conifer woods (Alb.; Tbl.; Log.).

(Boreal-)temperate American: B.C. to Côte Nord and Nfld., southw. to Mex. and Fla.; with the species, temperate circumpolar.

2. Pterospora Nutt.

(Pine Drops)

1. **P. andromedea** Nutt. [Gr]

Conifer woods (Bic).

Temperate American: B.C. to e. Que., southw. to Mich. and Pa., and in the mts. to Mex.

3. CHIMAPHILA Pursh
(Prince's Pine. Pipsissewa)

1. **C. umbellata** (L.) Bart., var. **cisatlantica** Blake, Rhod. 19: 241. 1917. [Hpr (Evergreen)] (subsp. *cisatlantica* (Blake) Hultén, Fl. Alaska and Yukon 8: 1203. 1948.)

Conifer woods (Bic; Rim.; Mtn.; Trl.; Lou.; Gpe.; Drt.; Gnd.; Bon.; New Carlisle; PCa.; Car.; Nou.); subalpine conifer woods (Mtt.). General in its habitat.

(Boreal-)temperate eastern American: James Bay to e. Que., southw. to Minn., Mich., Va., and Me.; the whole species boreal circumpolar.

4. PYROLA (Tourn.) L.
(Wintergreen. Shinleaf)

- a. Style straight, much narrower than the peltate 5-rayed stigma; petals and stamens erect and connivent; anthers not narrowed below the openings.
  - b. Style short; hypogynous disk none; petals without nectaries; flowers white; raceme regular; leaves roundish, slightly crenulate ....1. *P. minor*
  - b. Style long, exserted; hypogynous disk present, 10-lobed; petals each with 2 tubercle-like nectaries; flowers greenish white, in a 1-sided raceme; leaves crenate-serrate, mucronate, rather short-petioled, scattered.
    - c. Leaves elliptic-lanceolate, acuminate, dark olive-green, 3 cm. long, 1·5 cm. broad; stem elongated, more or less trailing, leafy; raceme long, many-flowered ....2. *P. secunda*
    - c. Leaves elliptic-orbicular, pale, yellowish green, dull, 1·5 cm. long, 1 cm. broad; stem short, few-leaved; raceme short, few-flowered..2a. *P. secunda*, var. *obtusata*
- a. Style strongly deflexed at the base, then curved upward, longer than the connivent or spreading petals; stigma much narrower than the truncate excavated ring-like apex of the style; filaments declined and curved upward; anthers contracted below the openings, forming a short neck.
  - b. Sepals little if at all longer than broad.
    - c. Petals whitish, obovate, rather spreading; anther-sacs blunt; raceme many-flowered; calyx-lobes ovate, acute; leaves thin, dull, elliptic or obovate-oval, longer than the margined petiole..............................3. *P. elliptica*
    - c. Petals greenish white, elliptic, obtuse, converging; anther-sacs short-beaked; scape few-flowered, naked or with a single small bract; leaves thick, dull, ovate to orbicular or reniform, shorter than the petiole...................4. *P. virens*
  - b. Sepals much longer than broad, at least about half longer.
    - c. Petals pink or rose-purple; sepals ovate to ovate-lanceolate, about 1½ times as long as broad; leaf-blades shorter than the petioles, crenulate; anthers deep purplish red.
      - d. Leaf-blades broad-elliptic or round-reniform, cordate at base..5. *P. asarifolia*
      - d. Leaf-blades obovate or suborbicular, rounded to the base.................. ....5a. *P. asarifolia*, var. *purpurea*
    - c. Petals white or greenish white; sepals about twice as long as broad.
      - d. Sepals lanceolate, acute, entire; petals thick and opaque, not conspicuously veined, without a pale margin on drying; anthers deep golden-yellow; bracts lanceolate, 7-8 mm. long; leaf-blades suborbicular, obovate or oval, tapering at the base, entire or crenulate ....6. *P. rotundifolia*, var. *americana*
      - d. Sepals elliptic or lance-elliptic, rounded or obtuse, crenulate; petals thin, translucent, strongly veined, leaving a conspicuous pale whitish margin on drying; anthers bright lemon-yellow; bracts lanceolate, 4-5 mm. long; leaf-blades orbicular or round-oval, rounded at both ends, scarcely crenulate.... ....8. *P. grandiflora*

1. **P. minor** L. [Hrr (Evergreen)]

Conifer woods (Bic; Rim.; Mét.; Mtn.; Ann.; Lou.; For.; Drt.; Pcé.; Bon. I.; PCa.; Car.; Nou.); subalpine conifer woods (Alb.; Tbl.). General in its habitat.

(Arctic-)boreal circumpolar: Aleutian Is., Alaska, Yukon, Mack. (Mack. R. Delta, Great Bear L.), Hudson Bay, n. Lab., and Nfld., southw. to Calif., N. Mex., Minn., and N. Eng.; w. and e. Greenland; Iceland; Faeroes; arctic and alpine Eurasia.

2. **P. secunda** L. [Hrr (Evergreen)] (*See* Porsild, Rhod. 41: 274. 1939.)

Conifer woods (Bic; Rim.; Grand Lac Matane; Lac à Foin; Prr.; Drt.; Yrk.; Jhn.; Pcé.; Tra.; Cap à l'Enfer; Anse au Gascon; Irn.); cedar swamp (Car.); subalpine conifer woods (Alb.); alpine bog (Str.). General in its habitat.

(Arctic-)boreal circumpolar: Alaska, Yukon, Mack. (Mack. R. Delta, Great Bear L.), Hudson Bay (Chesterfield Inlet), Ungava Bay, n. Lab., and Nfld., southw. to Calif., N. Mex., Nebr., Ind., Mich., and Md.; Mexico; Greenland; Iceland; arctic and alpine Eurasia.

2a. **P. secunda,** var. **obtusata** Turcz. (*See* Porsild, Rhod. 41: 274. 1939.)

Conifer woods (Mét.; Mtn.; Lac Mont Louis; New Carlisle; New Richmond; Nou.); banks of subalpine stream (Alb.).

The prevailing type in the northern part of the range.

3. **P. elliptica** Nutt. [Hrr (Evergreen)]

Conifer woods (Bic; Rim.; Mét.; Cap Chat; Ann.; Yrk.; GCa.; Nou.). General in its habitat.

(Boreal-)temperate American: B.C. and Alb. (Wood Buffalo Park) to Nfld., southw. to N. Mex., Iowa, and D.C.

4. **P. virens** Schweigg. [Hrr (Evergreen)] (*P. chlorantha* Sw.; *See* Fernald, Rhod. 43: 167. 1941.)

Conifer woods (Bic; Rim.; Trl.; Prr.; Mad.; Ren.; Gpe.; Drt.; Pcé.; Bon I.). General in its habitat.

Boreal circumpolar: Alaska, Yukon, Mack. (Great Bear L.), to James Bay, s. Lab., and Nfld., southw. to Wash., Ariz., Nebr., Ill., and D.C.; arctic and alpine Eurasia.

Forma *paucifolia* Fernald, with leaves mostly cuneate at base and subtruncate at summit, calyx-lobes broadly deltoid, has been collected at Mont Joli, Mont St. Pierre, and Petite Vallée.

5. **P. asarifolia** Michx. [Hrr (Evergreen)]

Conifer woods (Bic; Rim.; Mtn.; Lou.; Plr.; Clr.; Drt.; Yrk.; Jhn.; Bon.; GCa.; Car.; Mat.; Irn.). General in its habitat.

Boreal American: Alaska, Yukon, Mack., James Bay, s. Lab., and Nfld., southw. to s. Calif., N. Mex., S. Dak., Ind., and N. Eng.; e. Asia.

5a. **P. asarifolia,** var. **purpurea** (Bunge) Fernald. (Var. *incarnata* Fernald, Rhod. 6: 178-179. 1904; *See* Fernald, Rhod. 51:103. 1949.)

Cedar swamps (New Carlisle; Bon.).

Northern part of the range.

6. **P. rotundifolia** L., var. **americana** (Sweet) Fernald. [Hrr (Evergreen)] (*P. americana* Sweet.)

Conifer woods (Bic; Nou.; St. Moise).

(Boreal-)temperate American: S. Dak. to e. Que. and Nfld., southw. to Ohio and Ga.; with the species, arctic circumpolar.

7. **P. grandiflora** Radius. [Hrr (Evergreen)] (*P. rotundifolia,* var. *pumila* Hornem.; *P. groenlandica* Hornem.; *See* Porsild, Rhod. 41: 271-273. 1939.) N. Am. Fl. 29: 25. 1914.

Calcicole: cliffs above Lac des Américains (Tbl.) (with *Saxifraga nivalis* var. *tenuis, Carex rupestris, Pedicularis flammea, Campanula uniflora,* and *Senecio pauciflorus*); calcareous alpine meadow (Tbl.); rocky and peaty alpine slopes (Log.; Mtt.; Ftn.; Pem.).

Arctic circumpolar: n. coast of Alaska, Yukon, Mack. (Mack. R. Delta, Great Bear L., Coronation Gulf), n. Hudson Bay (Chesterfield Inlet, Coats I., Hudson Str.), Boothia Pen., Ellesmere, Devon, Baffin, n. Lab., and Nfld., southw. in the mts. to s. B.C. and Gaspe; w., n., and e. Greenland; n. Eurasia.

5. MONESES Salisb.
(One-flowered Pyrola)

1. **M. uniflora** (L.) Gray. [Gr (Evergreen)]

Conifer woods (Bic; Mét.; Mtn.; Trl.; Gpe.; Drt.; Jhn.; GCa.; Cap à l'Enfer); subalpine conifer woods (Tbl.); alpine meadow (Tbl.). General in its habitat.

Boreal circumpolar: Alaska, Yukon, Mack. (Mack. R. Delta, Great Bear L.), middle Hudson Bay (w. and e. coasts), Lab., and Nfld., southw. to n. Calif., Oreg., Colo., Minn., Mich., Pa., and Conn.; Greenland; Iceland; arctic and alpine Eurasia.

6. LEDUM L.
(Labrador Tea)

1. **L. groenlandicum** Oeder. [N (Evergreen)] (*L. palustre,* subsp. *groenlandicum* (Oeder) Hultén, Fl. Alaska and Yukon 8: 1219. 1948.)

Heath bogs (Bic; Mét.; Mtn.; R. Blanche; Mal.; Car.; Nou.; Sayabec); raised hummocks in salt marshes (Bnc.; Bon.); raised hummocks near marly pond (Oie); alpine bogs (Alb.; Tbl.; Log.; Ftn.; Str.; Berry Mt.).

(Arctic-)boreal American, alpine: Alaska, Yukon, Mack. (Mack. R. Delta, Great Bear L.), Hudson Bay (Churchill), Ungava Bay, n. Lab., and Nfld., southw. to Wash., Sask., Wis., Pa., and N.J.; sw. Greenland.

Forma *denudatum* Victorin & Rousseau, with leaves less coriaceous, the margins not revolute or scarcely so, not woolly beneath, but merely with long hairs, especially on the nerves (Contrib. Inst. Bot. Univ. Montréal, No. 36: 44. 1940), has been collected on raised hummocks in a cedar swamp at Bic, the type station.

7. LOISELEURIA Desv.
(Alpine Azalea)

1. **L. procumbens** (L.) Desv. [Ch (semi-shrubby) Evergreen]

Alpine slopes (Alb.; Tbl.; Log.; Mtt.).

Arctic circumpolar, alpine: Aleutian Is., n. coast of Alaska, Yukon, Mack. (Mack. R. Delta, Great Bear L., Coronation Gulf), Hudson Bay (Chesterfield Inlet, Hudson Str.), Baffin, Melville, Lab., and Nfld., southw. in the mts. to Alb. and N.H.; w. and e. Greenland; Iceland; Faeroes; arctic and alpine Eurasia.

8. RHODORA L.
(Rhodora)

1. **R. canadensis** L. [N]

Heath bog (Cha.); boggy thicket (New Carlisle).

(Boreal-)temperate eastern American: w. Que. and Côte Nord to Nfld., southw. to Pa. and N.J.

9. RHODODENDRON L.
(Lapland Rose Bay)

1. **R. lapponicum** (L.) Wahl. [Ch (passive) Evergreen]

Alpine serpentine barrens (Alb.); alpine granitic tableland (Tbl.); mossy alpine schists (Log.).

Arctic circumpolar, alpine: Alaska, Yukon, Mack., Victoria I., Keewatin, s. Ellesmere, Devon, n. Baffin, Melville, n. Lab., and Nfld., southw. to the Great Lakes region, and in the mts. to Gaspe, N. Eng., and N.Y.; w. and e. Greenland; Spitsbergen; arctic Scandinavia and Russia.

10. PHYLLODOCE Salisb.
(Mountain Heath)

1. **P. coerulea** (L.) Bab. [Ch (semi-shrubby) Evergreen]

Damp mossy alpine slopes (Alb.; Tbl.; Log.; Mtt.).

Arctic ?circumpolar, alpine: Alaska; gap in Yukon and w. Mack.; Mack. east of Great Slave L., Keewatin, s. and e. Baffin, Hudson Str., n. Lab., and Nfld., southw. in the mts. to Me. and N.H.; w. and e. Greenland; Iceland; arctic and alpine Eurasia (large gaps).

11. KALMIA L.
(Laurel)

a. Corymbs lateral, slightly glandular, many-flowered; flowers crimson; leaves petioled, plane; branchlets terete..1. *K. angustifolia*

a. Corymbs terminal, smooth, few-flowered; flowers rose-purple; leaves nearly sessile, with revolute margins; branchlets 2-edged..........................2. *K. polifolia*

1. **K. angustifolia** L. [N (Evergreen)] Sheep Laurel

Heath bogs (Bic; Rim.; Mét.; Ann.; Lou.; Dou.; Pcé.; Gnd.; Sayabec); raised hummocks in salt marsh (Bnc.); swampy soil (Baie des Sables); bare rocks (Bic); conifer woods (Drt.; Zén.); alpine bog on serpentine tableland (Alb.); alpine rocks (Str.); subalpine conifer woods (Berry Mt.). General.

Boreal eastern American, alpine: Hudson Bay to Lab. and Nfld., southw. to Mich. and Ga.

2. **K. polifolia** Wang. [N (Evergreen)] (*K. glauca* Ait.) Bog Laurel

Heath bogs (Bic; Rim.; Mét.; R. Blanche; Lou.; Nou.); alpine bogs and meadows (Alb.; Tbl.; Log.; Str.); heath bog on alpine serpentine barrens (Alb.).

(Arctic-)boreal American: Aleutian Is., Alaska, Yukon, Mack. (Great Bear L., Coronation Gulf), Keewatin, n. Lab., and Nfld., southw. to Calif., Sask., Minn., Pa., and N.J.

12. CASSIOPE D. Don

(Cassiope)

1. **C. hypnoides** (L.) D. Don. [Ch (passive) Evergreen]

Alpine slopes (Alb.; Tbl.; Log.; Mtt.; McNab); alpine serpentine barrens (Alb.).

Arctic circumpolar, alpine: gap in western N.A.; Keewatin, Coats I., Hudson Str., Baffin, Akpatok I., n. Lab., and Nfld., southw. to the Great Lakes region, and in the mts. to N.Y.; w. and e. Greenland; Iceland; Spitsbergen; arctic and alpine Eurasia.

13. CHAMAEDAPHNE Moench

(Leather Leaf. Cassandra)

1. **C. calyculata** (L.) Moench. [N (Evergreen)]

Heath bogs (Bic; Mal.; Car.; Sayabec); swampy soil (Dou.; Gnd.; New Carlisle; Zén.); raised hummocks in salt marshes (Bnc.; Bon.); alpine bog (Str.); alpine slopes (Alb.; Tbl.; Str.).

(Arctic-)boreal circumpolar, alpine: Alaska, Yukon, Mack. (Mack. R. Delta, Great Bear L.), James Bay, Lab., and Nfld., southw. to B.C., Minn., n. Ind., and Ga.; arctic and alpine Eurasia (gap in western Europe).

It is probable that most of the collections cited above should be referred to var. *angustifolia* (Ait.) Rehder, although some may prove, on further study, to be var. *latifolia* (Ait.) Fernald. (*See* Fernald in Rhod. 47: 390-391. 1945.)

14. ANDROMEDA L.

(Bog Rosemary)

1. **A. glaucophylla** Link. [N (Evergreen)]

Swampy soil (Bic; Rim.; Ann.; Dou.; Mal.; Gnd.; Bon.; Oie); raised hummocks in salt marsh (Bnc.); edge of alpine stream (R. du Diable, Alb.); wet depressions on alpine serpentine barrens (Alb.); alpine bog (Tbl.).

(Arctic-)boreal American: Man., James Bay, Ungava Bay, Lab., and Nfld., southw. to Minn. and N.J.; s. Greenland.

15. EPIGAEA L.

(Trailing Arbutus. Mayflower)

1. **E. repens** L., var. **glabrifolia** Fernald, Rhod. 41: 446. 1939. [Ch (active) Evergreen]

Conifer woods (Bic; Lou.; Drt.; Yrk.; Dou.; Mal.; Gnd.; Bon.; Car.); sand dunes (Pén.); dry rocks (Rim.; Anse au Gascon); alpine serpentine slopes (Alb.); alpine rocks and bogs (Str.); subalpine conifer woods (Mt. Baldé).

Boreal American, alpine: Sask. to Lab. and Nfld., southw. to Iowa, Wis., Mich., Ohio, W. Va., and Pa., and along the mts. to Tenn. and N.C.; more northern than the species.

16. GAULTHERIA (Kalm) L.

1. **G. procumbens** L. [Hpr (Evergreen)] Aromatic Wintergreen. Checkerberry

Spruce swamp (Nou.).

(Boreal-)temperate American: Man. to e. Que. and Nfld., southw. to Ala. and Ga.

17. ARCTOSTAPHYLOS Adans.

(Bearberry. Kinnikinick)

a. Fruit red, insipid; nutlets coalescent; leaves persistent, obovate or spatulate, entire, smooth, and shining.
  b. Very young branchlets minutely tomentulose and commonly somewhat viscid, but soon glabrate........1. *A. Uva-ursi*
  b. Branchlets canescent-tomentulose, not viscid, the minute tomentum persistent........1a. *A. Uva-ursi,* var. *coactilis*
a. Fruit black, juicy, and edible; nutlets separate; leaves deciduous, conspicuously reticulate-veined, obovate, crenulate, ciliate at least when young........2. *A. alpina*

1. **A. Uva-ursi** (L.) Spreng. [Ch (active) Evergreen]

Bare slaty calcareous rocks (Bic; Gnd.; New Carlisle; Mat.); dry alpine serpentine rocks (Alb.).

Boreal circumpolar: Aleutian Is., Alaska, Yukon, Mack. (Mack. R. Delta, Great Bear L.), James Bay, Lab., and Nfld., southw. to Calif., N. Mex., Mo., n. Ind., and Ga.; w. Greenland; Iceland; Eurasia.

1a. **A. Uva-ursi,** var. **coactilis** Fernald & Macbride, Rhod. 16: 212. 1914.

Bare rocks (Bic); rocks by subalpine stream (R. du Diable, Alb.).

Boreal American: Yukon, Mack. (Great Slave L.) to Mingan Is. and Nfld., southw. to Ill. and Va., and in the mts. to Calif. and Colo.

2. **A. alpina** (L.) Spreng. [Ch (active)]

Alpine summits (Alb.; Tbl.; Ftn.); subalpine meadow (Log.).

Arctic circumpolar, alpine: Aleutian Is., n. coast of Alaska, Herschel I., Yukon, Mack. (Mack. R. Delta, Great Bear L., Coronation Gulf), Banks I., Victoria I., Somerset I., Ellesmere, Baffin, Melville, n. Lab., and Nfld., southw. in the mts. to s. B.C. and N. Eng.; n. and e. Greenland; arctic and alpine Eurasia.

18. CHIOGENES Salisb.

(Creeping Snowberry)

1. **C. hispidula** (L.) T. & G. [Ch (active) Evergreen]

Damp conifer woods (Bic; Ann.; Drt.; Pcé.; Gnd.; GCa.; Car.); hummocks in cedar swamp (Bic); dry cliffs (Bic); subalpine slopes (Alb.; Bln.). General.

Boreal American: B.C. to James Bay, Lab., and Nfld., southw. to Idaho and N.C.

19. VACCINIUM L.

(Blueberry. Bilberry)

a. Corolla open-campanulate, 4-lobed, rose-pink or red; anthers awnless; filaments hairy; fruit red; leaves small, obovate, coriaceous, persistent, shining above, dotted with brown glands beneath, the margins revolute; plants forming mats 2-10 cm. high ....1. *V. Vitis-Idaea,* var. *minus*

a. Corolla cylindric, subglobose or urceolate, 4-5-toothed or lobed; fruit blue; leaves larger, deciduous; plants taller.

  b. Flowers in dense clusters, short-pedicelled, 5-toothed; anthers awnless; filaments hairy.

    c. Leaves entire, downy on both sides; branchlets pubescent........2. *V. canadense*

    c. Leaves distinctly serrulate with bristle-pointed teeth, bright green, smooth and shining on both sides; branchlets glabrous, warty.

      d. Mature leaves 7-20 mm. long, 3-7 mm. broad, lanceolate..3. *V. angustifolium*

      d. Mature leaves 20-35 mm. long, 8-15 mm. broad, lanceolate or oblong; fruit larger ....4. *V. Lamarckii*

  b. Flowers solitary or 2-3 together, 4-5-toothed; anthers 2-awned on the back; filaments glabrous.

    c. Parts of the flowers mostly in fours; flowers 1-3, almost sessile, short, urceolate; stamens 8; leaves entire, dull, obovate or oblong; low and spreading stout shrubs.

      d. Macrophyllous ....5. *V. uliginosum*

      d. Microphyllous ....5a. *V. uliginosum,* var. *alpinum*

    c. Parts of the flowers in fives; flowers solitary on short axillary drooping peduncles; stamens 10; leaves membranaceous, glabrous.

      d. Leaves obovate, cuneate-lanceolate or cuneate-spatulate, smooth and shining, serrulate; corolla ellipsoid, slightly urceolate; branches rounded; shrubs 0·5-3 dm. high..6. *V. caespitosum*

      d. Leaves elliptic, obtuse or subacute; shrubs 2-15 dm. high.

        e. Leaves entire or nearly so, green above, glaucous beneath; corolla globose-ovoid.. 7. *V. ovalifolium*

        e. Leaves serrulate with fine and numerous appressed spinulose teeth, somewhat lustrous; corolla ellipsoid-urceolate..................8. *V. nubigenum*

1. **V. Vitis-Idaea** L., var. **minus** Lodd. [Ch (semi-shrubby) Evergreen] Rock Cranberry

Slaty sea ledges (Bic); sea cliffs (For.; Bon. I.); bog (Gnd.); alpine cliffs (Alb.; Tbl.; Ftn.); habitat not stated (R. Blanche; Ann.; Yrk.; Dou.; Mal.; New Carlisle; Bon.; Cha.).

Arctic circumpolar, alpine: Aleutian Is., n. coast of Alaska, Yukon, Mack. (Mack. R. Delta, Great Bear L.), Victoria I., Melville, Baffin, n. Lab., and Nfld., southw. to Vancouver I., Alb., Sask., the Great Lakes region, and e. Que., and in the mts. to Vt.; w. Greenland; Iceland; Faeroes; arctic and alpine Eurasia.

2. **V. canadense** Kalm. [N] Canada Blueberry

Dry slaty cliffs (Bic); spruce swamp (Nou.); subalpine woods (Alb.; Tbl.); habitat not stated (Pte. au Père; Gpe.; Dou.; Mal.; Gnd.; Cha.; New Carlisle; Bon.; Car.; Nou.; Zén.).

Boreal American: Mack. and Man. to Lab., southw. to Ill., La., and Va.

3. **V. angustifolium** Ait. [N] (*V. pensylvanicum,* var. *angustifolium* (Ait.) Gray.)

Railway embankment (Bic); mossy swamp (R. Blanche); sand dunes (Pén.); subalpine and alpine slopes (Alb.; Tbl.; Log.; Ftn.; Str.; Lyl.).

Boreal eastern American, alpine: Minn. to Nfld., southw. to W. Va. and N.J.; somewhat more northerly than the following.

4. **V. Lamarckii** Camp. [N] (*V. pensylvanicum* Lam.; *See* Camp, Bull. Torrey Bot. Club 71: 180. 1944.) Blueberry

Dry slaty cliffs (Bic); heath bogs (Bic; Sayabec); cedar swamp (Gnd.); sand dunes (Pén.); alpine bog (Tbl.); subalpine and alpine slopes (Alb.; Tbl.; Str.; Lyl.); habitat not stated (Mét.; Trl.; Gpe.; Dou.; Mal.; Gnd.).

(Boreal-)temperate American, alpine: Sask. to Côte Nord and Nfld., southw. to Wis., Ill., and Va.

5. **V. uliginosum** L. [Ch (passive)] (*See* Hultén, Fl. Alaska and Yukon 8: 1258. 1948.) Bog Bilberry

Alpine serpentine slopes (Alb.).

(Arctic-)boreal circumpolar, alpine: Alaska (Seward Pen.), Yukon, Mack. (Mack R. Delta, Great Slave L.), middle Hudson Bay (Churchill, Port Harrison), n. Que., and Nfld., southw. to B.C., Mich., and mts. of N.H.; w. and e. Greenland; Iceland; Spitsbergen; arctic and alpine Eurasia.

Forma *pubescens* (Lange) Polunin, with leaves puberulent beneath (*See* Malte, Rhod. 36: 184. 1934; Polunin, Nat. Mus., Canada, Bull. 92: 315. 1940), has been collected from alpine and subalpine localities (Tbl.; Str.; Bln.).

5a. **V. uliginosum,** var. **alpinum** Bigel. (*See* Fernald, Rhod. 25: 23-25. 1923; Malte, Rhod. 36: 183-184. 1934.)

River gravels (Bon.); alpine summits and slopes (Alb.; Tbl.; Log.; Mtt.; Ftn.; Str.; Bln.).

Arctic American, alpine: Aleutian Is., n. coasts of Alaska, Yukon, and Mack. (also Great Bear L.), Victoria I., Cornwallis I., Somerset I., Ellesmere, Devon, Baffin, Melville, Hudson Str., n. Lab., and Nfld., southw. to n. Wash., Alb., the Great Lakes region, and e. Que., and mts. of N.H.; w. and e. Greenland; e. Asia.

Var. *alpinum,* forma *Langeanum* (Malte) Polunin, with leaves puberulent beneath (*See* Malte, Rhod. 36: 184. 1934; Polunin, Nat. Mus., Canada, Bull. 92: 315. 1940), has been collected from alpine stations (Alb.; Tbl.; Str.).

6. **V. caespitosum** Michx. [N] Dwarf Bilberry

Subalpine woods (Alb.; Tbl.; Log.; Mtt.; Ftn.; Pem.; Str.; Bln.).

Boreal American: Alaska (Sitka), Yukon, Lesser Slave L., James Bay, Lab., and Nfld., southw. to Calif., Utah, Colo., north shore of the Great Lakes, and Me., and in the mts. to N.Y.

7. **V. ovalifolium** Sm. [N]

Alpine summits (Alb.; Tbl.; Mtt.; Log.; Str.; Nic.; Bln.).

Disjunct American, alpine: Aleutian Is. and Alaska to Oreg. and Mont.; Great Lakes region; Que. to Lab. and Nfld.; e. Asia.

8. **V. nubigenum** Fernald, Rhod. 10: 53. 1908. [N]

Alpine slopes (Alb. (type station for material in flower and young fruit); Tbl. (type station for material in mature fruit); Log.; Ftn.; Pem.).

Gulf endemic, alpine: Gaspe Peninsula and w. Nfld.

20. Oxycoccus Hill
(Cranberry)

[Porsild, A. E.: The cranberry in Canada; Can. Field-Nat. 52: 116-117. 1938. Camp: A preliminary consideration of the biosystematy of Oxycoccus; Bull. Torrey Bot. Club 81: 426-436. 1944.]

a. Pedicels lateral, in maturity evenly curved, bearing 1 or 2 leaf-like green bracts; fruit 10-20 mm. in diameter; leaves 6-17 mm. long, 2-8 mm. broad, elliptic-oblong, rounded at the apex, flat or very slightly revolute; stems stout, trailing, often several metres long.......... 1. *O. macrocarpus*

a. Pedicels terminal, abruptly curved toward the tip, bearing a pair of scaly bracts; fruit 8-12 mm. in diameter; leaves smaller, pointed; stems slender, creeping.

  b. Leaves 6-10 mm. long, 2-5 mm. broad, flat or slightly revolute; pedicels 1-4; fruit 8-12 mm. in diameter..........2. *O. quadripetalus*

  b. Leaves 2-5 mm. long, 1·5-3 mm. broad, strongly revolute, arranged somewhat unilaterally; pedicels 1 or 2, strongly pubescent; style shorter than in other members of the genus, barely exceeding the anthers; fruit less than 10 mm. in diameter..........2a. *O. quadripetalus*, var. *microphyllus*

1. **O. macrocarpus** (Ait.) Pers. [Ch (passive) Evergreen] (*Vaccinium macrocarpon* Ait.)

Brackish marsh (Bnc.).

(Boreal-)temperate eastern American: Minn. to Nfld., southw. to Tenn. and N.C.; introduced into Europe.

2. **O. quadripetalus** Gilib. [Ch (passive) Evergreen] (*Vaccinium Oxycoccus* of Am. auth. in part.)

Cedar swamp (New Richmond).

Boreal American: n. Sask. and n. Man. to James Bay (Charleton I.), Gaspe Peninsula, and Cape Breton I., southw. to Wis., Ind., Pa., and N.J.

2a. **O. quadripetalus,** var. **microphyllus** (Lange) M. P. Porsild. (*Vaccinium Oxycoccus* of Am. auth. in part.)

Moss in heath bogs (Bic; Anse à la Loutre); subalpine meadow (Tbl.); wet depressions on alpine serpentine barrens (Alb.).

(Arctic-)boreal eastern American: middle coast of Labrador (Turnavik), southw. to Gaspe Peninsula, Magdalen Is., and Nfld.; w. and s. Greenland; Iceland.

Porsild (l.c.) states that "In Greenland and Labrador the var. *microphyllus* by its minute leaves and very pubescent pedicels seems well enough distinct from *O. quadripetalus*, but since intermediate forms abound in the Gulf of St. Lawrence region it seems best to retain the varietal rank."

74. DIAPENSIACEAE
(Diapensia Family)

1. Diapensia L.
(Diapensia)

1. **D. lapponica** L. [Ch (cushion) Evergreen]

Alpine slopes (Alb.; Tbl.; Ftn.).

Arctic ?circumpolar, alpine: (large gap in western N.A., where replaced by var. *obovata* Fr. Schm.), Mack., Hudson Bay (Chesterfield Inlet, Coats I.), Salisbury I., Hudson Str., e. Baffin, n. Lab., and Nfld., southw. in the mts. to N.Y.; w. and e. Greenland; Iceland; present, but with large gaps, in arctic and alpine Eurasia. According to Polunin (Nat. Mus., Canada, Bull. 92: 317. 1940) the species has an isolated high-arctic station at Discovery Harbour in Ellesmere.

75. PLUMBAGINACEAE

(Leadwort Family)

a. Scape much branched, panicled, the flowers lavender-colour, scattered or loosely spiked and 1-sided on the branches; leaves oblong, spatulate or obovate-lanceolate, 1-ribbed, tipped with a deciduous bristly point; maritime species........1. *Limonium*

a. Scapes 1-7, the flowers in a dense terminal hemispheric head 1·5-2 cm. in diameter; calyx-limb 5-lobed, whitish to pale lavender, scarious, with intermediate teeth; petals lilac; leaves narrowly linear, short-subulate-pointed or slightly apiculate; Mt. Albert serpentine barrens..2. *Armeria*

1. LIMONIUM Mill.

(Sea Lavender)

1. **L. Nashii** Small, var. **trichogonum** Blake. [Hs] (*L. carolinianum* of Gray's Man., ed. 7; *L. trichogonum* Blake in Rhod. 18: 61. 1916; *See* Rhod. 25: 58. 1923.)

Halophyte: tidal salt marshes (Bic; Pte. au Père; Lou.; Car.).

Boreal eastern American (maritime): e. Que. to Lab. and Nfld., southw. along the coast to Va.; more northern than the typical form.

2. ARMERIA Willd.

1. **A. maritima** (Mill.) Willd., var. **labradorica** (Wallr.) Lawr. [Ch (cushion)] (*Statice labradorica* (Wallr.) Hubbard & Blake, Rhod. 19: 6. 1917; *A. labradorica*, var. *submutica* (Blake) Lewis, Can. Field-Nat. 46: 40, 92. 1932, including f. *glabriscapa* (Blake) Lewis, l.c., and f. *pubiscapa* (Blake) Malte, Rhod. 36: 185. 1934; *See* Lawrence, Gentes Herbarum 4: 405. 1940, and Amer. Midland Nat. 37: 770-772. 1947.)

Crevices and detritus of alpine serpentine barrens (Alb.).

Arctic eastern American, alpine: n. Hudson Bay (w. and e. coasts), Hudson Str., s. Baffin, and northernmost Lab., southw. to James Bay and Gaspe Peninsula; isolated in mts. of ?Colo.; the whole species arctic circumpolar.

76. PRIMULACEAE

(Primrose Family)

a. Leaves in a basal rosette; corolla salver-shaped or funnel-form; flowers umbellate on a naked scape.

  b. Corolla pink, lilac, or pale purple, the tube longer than the calyx, open at the throat; style slender..1. *Primula*

  b. Corolla about 4 mm. long, white, the tube shorter than the calyx, constricted at the throat; style short; bracts of the involucre subulate, 3-4 mm. long; leaves lanceolate to oblong-lanceolate, narrowed at the base, toothed........2. *Androsace*

a. Leaves opposite or verticillate on the stem; corolla, if present, rotate.
  b. Leaves in a whorl of 5-10 at the top of the stem, membranous, elongate-lanceolate, tapering to both ends; corolla white or pinkish, the petals finely pointed; rootstocks very slender, elongated..................................3. *Trientalis*
  b. Leaves opposite.
    c. Corolla none; flowers minute, solitary in the axils, nearly sessile, the calyx petal-like; leaves sessile, entire, fleshy..................................4. *Glaux*
    c. Corolla present, yellow..................................5. *Lysimachia*

1. PRIMULA L.

(Primrose. Cowslip)

a. Leaves farinose beneath; scape comparatively stout, often farinose at summit; calyx usually farinose; corolla lilac, the tube only slightly exserted; style and anthers not exserted from the yellow throat; capsule ellipsoid; seeds angulate, reticulated..................................1. P. *laurentiana*

a. Plant farinose; scape slender; corolla pink, lilac, or bluish purple, with a conspicuous orange or yellow eye, the tube exserted; stigma or tops of anthers protruding from the throat of the shrivelled corolla; capsule subcylindric; seeds rounded, nearly smooth..................................2. *P. mistassinica*

1. **P. laurentiana** Fernald. [Hr] (*P. farinosa* L., var. *macropoda* Fernald; *See* Rhod. 30: 68. 1928.) Bird's-eye Primrose

Calcicole: sea cliffs (Bic (type station); Mtn.; Gro.; Ann.; Trl.; Srl.; Cld.; Prr.; Plr.; Lou.; Ren.; For.; Pcé.; Bon. I.).

Boreal eastern American: e. Que. to s. Lab. and Nfld., southw. to N.S. and Me.; with *P. farinosa,* boreal circumpolar.

2. **P. mistassinica** Michx. [Hr] *See* Fernald, Rhod. 30: 88-89. 1930.

Calcicole: sea cliffs (Pcé.); cliffs above lake (Lac Pleureuse); river ledges and gravels (Rim.; Ann.; Cld.; Lou.; Drt.; Portage; Gnd.; Bon.; PCa.; GCa.; Pab.; Mat.); alpine cliffs (Tbl.; Log.; Pem.).

Boreal American, alpine: Alaska, Yukon, Mack. (Great Bear L., Great Slave L.), James Bay, s. Lab., and Nfld., southw. to B.C., Alb., the Great Lakes region, and N.H.

Forma *leucantha* Fernald, with white corolla (*See* Rhod. 30: 89. 1928), has been collected from sea cliffs at Percé.

2. ANDROSACE (Tourn.) L.

1. **A. septentrionalis** L., var. **robusta** St. John, Dept. of Mines, Canada, Mem. 126: 48. 1922. [T]

Calcicole: sea cliffs and talus (Bic; Srl.; For.).

Arctic American: gap in Alaska and N.W.T., where replaced by the species; Coronation Gulf, Victoria I., King William I., Keewatin, Ellesmere, Baffin, Hudson Bay, Lab., and Nfld., southw. to the Mingan Is. and Gaspe; the whole species arctic circumpolar.

3. TRIENTALIS L.

(Starflower)

1. **T. borealis** Raf. [Hpr]

Conifer woods (Bic; Rim.; Ann.; Ren.; Yrk.); subalpine conifer woods (Alb.; Tbl.; Bln.). General in its habitat.

Boreal American: Alb. to James Bay, s. Lab., and Nfld., southw. to Ill. and Va.

4. GLAUX (Tourn.) L.

(Sea Milkwort)

a. Plant diffusely branched, the branches prostrate, loosely ascending; leaves linear to oblong, the larger 3-12 mm. long, 1·5-6 mm. broad, bluntly pointed; mature capsules 2-2·5 mm. broad..1. *G. maritima*

a. Plant erect, simple or with few erect branches; leaves oval or broadly oblong, the larger 8-15 mm. long, 4-8 mm. broad, with rounded tips; mature capsules 2·5-4 mm. broad..1a. *G. maritima*, var. *obtusifolia*

1. **G. maritima** L. [Hp]

Halophyte: salt marshes (Bic; Bon.).

Psammophilous halophyte: seashore (Bic; Pte. au Père). General in its habitat.

Boreal circumpolar (maritime): Alaska, interior Yukon, Mack. (Great Slave L.), James Bay, Côte Nord, and Nfld., southw. to Calif., Nev., Utah, Colo., N. Dak., Minn., and N.J.; Iceland; Eurasia; one of the maritime elements in the flora of the Great Lakes.

1a. **G. maritima,** var. **obtusifolia** Fernald.

Halophyte: salt marshes (Bic; Pén.; Pas.).

Psammophilous halophyte: seashore (Bic; Pte. au Père; Mét.; Trl.; Lou.; Drt.; Bon.).

Atlantic and Pacific coasts of N.A.; Japan.

5. LYSIMACHIA (Tourn.) L.

(Loosestrife)

a. Staminodia 5, slender; lobes of the corolla cuspidate-pointed, erose-denticulate above, each separately involute around its stamen; anthers linear; leaves ovate, on long ciliate-fringed petioles..1. *L. ciliata*

a. Staminodia none; corolla-lobes convolute, dotted or streaked; anthers oblong or oval; leaves glandular-dotted.
  b. Flowers small, in dense, axillary, long-peduncled, spike-like racemes; filaments distinct, equal; lowest leaves scale-like........................2. *L. thyrsiflora*
  b. Flowers larger, in terminal, loose, wand-like racemes; filaments conspicuously monadelphous, unequal.
    c. Raceme leafy only at the base................................3. *L. terrestris*
    c. Raceme leafy to the middle or beyond......................4. × *L. producta*

1. **L. ciliata** L. [Hpr] (*Steironema ciliatum* (L.) Raf.; *See* Fernald, Rhod. 39: 438-442. 1937.) Fringed Loosestrife

Rich woods on island at river mouth (Mat.).

(Boreal-)temperate American: Alaska, Mack. (Great Slave L.), James Bay, Côte Nord, southw. to N. Mex., Kans., and Ga.

2. **L. thyrsiflora** L. [Hel] Tufted Loosestrife

Swampy soil (Bic).

Boreal circumpolar: Alaska, Mack. (Great Slave L.), and James Bay to e. Que., southw. to Calif., Mont., Colo., n. Ind., Pa., and N.Y.; Eurasia.

3. **L. terrestris** (L.) BSP. [Hpr] Swamp Candle

River gravels (Drt.; Bon.; Mat.); swampy soil (Bic; Bnc.); slaty soil (Rim.).

Boreal American: B.C., Hudson Bay, Côte Nord, and Nfld., southw. to Ariz., Ark., and Ga.

4. × **L. producta** (Gray) Fernald. [Hpr]

River gravels (Mat.).

Temperate eastern American: Mich. to e. Que., southw. to N.C.

77. OLEACEAE
(Olive Family)

1. FRAXINUS (Tourn.) L.
(Ash)

a. Lateral leaflets short-stalked, commonly 6, elliptic-oval; anthers linear; calyx present in the pistillate flowers; fruit tapering below, the body terete, not wing-margined..1. *F. americana*

a. Lateral leaflets sessile, commonly 10, lanceolate, more closely serrate; anthers short-oblong; calyx wholly absent; fruit of equal breadth at both ends, the body winged all around..2. *F. nigra*

1. **F. americana** L. [MM] White Ash

Calcareous talus slope (Prr.) (northeastern limit).

Temperate eastern American: Minn. to e. Que., southw. to Tex. and Fla.

2. **F. nigra** Marsh. [MM] Black Ash

Calcareous talus slopes (Cap Chat; Prr.); river shores (PCa.; Mat.); woods (Rim.); cedar swamp (Val.); rich woods at foot of mountain (Nic.).

(Boreal-)temperate American: Man. to Nfld., southw. to Ark., Ind., and w. Va.

78. GENTIANACEAE
(Gentian Family)

a. Leaves alternate, petioled, trifoliolate; corolla white or purplish, valvate, the whole upper surface white-bearded; rootstocks thick, creeping, sheathed by the membranous bases of the old petioles................................1. *Menyanthes*

a. Leaves opposite and sessile, simple; corolla not valvate.
  b. Corolla white or purplish, 4-5 spurred at base..........................2. *Halenia*
  b. Corolla spurless.
    c. Corolla rotate, pale mauve; sepals linear to lanceolate, resembling the upper leaves, and often much elongated..........................3. *Lomatogonium*
    c. Corolla campanulate-funnel-form, blue or white....................4. *Gentiana*

1. MENYANTHES (Tourn.) L.
(Buckbean)

1. **M. trifoliata** L. [Hel]

Swampy soil (Bic; Cap Chat; Cld.; Drt.; Dou.; Pcé.; Gnd.; Bon.; Nou.); brackish marsh (Bic; Gpe.); edge of pond in subalpine meadow (Tbl.).

(Arctic-)boreal circumpolar: Alaska, Yukon, Mack. (Mack. R. Delta, Great Bear L.), Keewatin, Hudson Bay (Churchill), James Bay, Ungava Bay, Lab., and Nfld., southw. to Calif., Colo., Nebr., Mo., and Va.; w. Greenland; Iceland; Eurasia. According to Fernald (Rhod. 31: 195-198. 1929), the eastern American plant forms a good geographical race, var. *minor* Michx.

2. HALENIA Borkh.
(Spurred Gentian)

1. **H. deflexa** (Sm.) Griseb. [T]

Fields (Bic; Rim.; Mét.; Mtn.; For.; Bon. I.; Car.); inland cliffs (Tra.); river gravels (Gnd.; Bon.; PCa.; GCa.; Nou.; Mat.; Res.); woods (Ann.; Cap Chat; Val.; Mad.; Amqui). General.

Psammophilous halophyte: sea beach (Bic; Fla.; Mét.; Car.).

Disjunct American: B.C. and Man. to S. Dak.; Great Lakes region; e. Que. to Lab. and Nfld., southw. to N.Y.; e. Asia.

3. LOMATOGONIUM A. Br.
(Marsh Felwort)

1. **L. rotatum** (L.) Fries. [T] (*Pleurogyne rotata* Griseb.)

Halophyte: brackish shores at river mouths (Ann.; Drt.; Jhn.; Pcé.).

(Arctic-) boreal circumpolar (maritime): Alaska, arctic coast of Yukon and Mack., Hudson Bay, n. Lab., and Nfld., southw. to B.C. (isolated in Colo.) and Gaspe Peninsula; w. Greenland; Iceland; arctic Russia; Altai and Baikal mts. The American plant is forma *americanum* (Griseb.) Fernald (*See* Rhod. 21: 197. 1919).

4. GENTIANA (Tourn.) L.
(Gentian)

a. Corolla open, without plaits or teeth in the sinuses.
  b. Corolla-lobes fringed at the sides, toothed at the summit; calyx with 2 lanceolate-subulate lobes alternating with 2 shorter ovate, acute lobes..........1. *G. gaspensis*
  b. Corolla-lobes with entire margins.
    c. Corolla 5-lobed, with a crown of setæ at the base of the acute lobes; margin of leaves minutely scabrous..........2. *G. acuta*
    c. Corolla 4-lobed, the lobes acuminate, naked at the base; calyx-lobes very unequal, the two outer ones ovate or oblong, acute, 5-7 mm. long, the rest linear, 3-5 mm. long..........3. *G. propinqua*

a. Corolla almost closed, with entire or 1-2 toothed triangular appendages in the sinuses, the lobes erect, roundish-ovate..........4. *G. linearis*

1. **G. gaspensis** Victorin, Contrib. Lab. Bot. Univ. Montréal, No. 20: 10. 1932. [T]

Halophyte: salt marsh at river mouth (Bon.).

Local endemic (maritime): representative of the cordilleran *G. Macounii* Holm and *G. tonsa* (Lunell) Victorin.

2. **G. acuta** Michx. [T] (*G. Amarella* L., var. *acuta* Michx.) Felwort

Calcicole: slaty fields and cliffs (Bic; Fla.; Mét.; Gro.; Trl.; Srl.; Val.; For.; Pcé.; Bon. I.); river gravels and ledges (Cap Chat; Cld.; Ren.;

Gnd.); gravelly beaches (Pas.; Car.); damp places (R. Blanche; Lou.; Dou.); dry alpine schists (Pem.).

Boreal American: Aleutian Is., Alaska, Yukon, Mack. (Great Bear L.), James Bay, s. Lab., and Nfld., southw. to Calif., Ariz., Colo., Minn., e. Que., and mts. of Vt.; s. Greenland; e. Asia.

3. **G. propinqua** Richards. [T] Rydberg, p. 661.

Calcicole: crest of talus below sea cliffs (Plr.).

Arctic American: Alaska, Yukon, Mack. (Mack. R. Delta, Great Bear L., Coronation Gulf), southw. to B.C. and Mont.; Hudson Bay (w. and e. coasts), James Bay, s. Lab., Nfld., and Gaspe; e. Asia.

4. **G. linearis** Froel. [Hp] Narrow-leaved Gentian

Swampy edge of lake (Canton Leclercq).

Temperate eastern American: Minn. to e. Que., southw. to Md.

79. APOCYNACEAE
(Dogbane Family)

1. APOCYNUM (Tourn.) L.
(Dogbane. Indian Hemp)

[Woodson: Studies in Apocynaceae; I. Ann. Missouri Bot. Gard. 17: 1-213. 1930.]

a. Corolla pink or pink-striped or white, 4-9 mm. long (twice as long as the calyx lobes), the lobes more or less spreading; leaves usually drooping or spreading.
  b. Cymes both terminal and axillary, flowering simultaneously; flowers 6-9 mm. long. nodding; corolla campanulate, pink with deeper stripes in the tube, the lobes spreading, finally recurved................................1. *A. androsaemifolium*
  b. Cymes terminal or at the tips of leafy branches, the central one flowering earliest; flowers 4-7 mm. long, spreading or slightly nodding; corolla urceolate to short-tubular, white or pink-tinged, the tube somewhat pentagonal, the lobes slightly spreading but not recurved.....................................2. × *A. medium*

a. Corolla greenish or greenish white, 3-4·5 mm. long, the lobes ascending; cymes terminal, the central one flowering first, of mostly erect flowers; leaves usually ascending.
  b. Leaves petioled, mostly narrowed at the base; bracts of the inflorescence rather inconspicuous and scarious ....3. *A. cannabinum*
  b. Leaves sessile or very nearly so, mostly cordate-clasping or obtuse at the base; bracts of the inflorescence usually rather conspicuous and subfoliaceous; stems prostrate..4. *A. sibiricum*

1. **A. androsaemifolium** L. [Hp] (*See* Woodson, Rhod. 34: 30-31. 1932.) Spreading Dogbane

River gravels (Gnd.; Bon.); edge of marly pond (Oie); roadside (Beauséjour; Zén.); mossy woods along trail (Lou.); habitat not stated (Bic; Lou.; Yrk.; Dan.; Car.; Nou.; Amqui).

Boreal American: Alaska, Yukon, Mack. (Great Slave L.), s. Man., James Bay, the Great Lakes, Anticosti I., and Nfld., southw. to Calif., Ariz., Colo., n. Ind., and Ga.

2. × **A. medium** Greene. [Hp]

River ledges and gravels (Ann.; Bon.; GCa.; Res.).

(Boreal-)temperate eastern American: Minn. to Nfld., southw. to Tex. and Fla.

3. **A. cannabinum** L. [Hp] Hemp Dogbane. Indian Hemp

River gravels (Rim.; Drt.; Dou.; Gnd.; Bon.; GCa.; Mat.).

(Boreal-)temperate eastern American: Wis. to Nfld., southw. to Kans. and Ala.

4. **A. sibiricum** Jacq. [Hp]

River gravels (Rim.; Mtn.; Drt.; Gnd.; Bon.; Mat.).

Boreal American: Mack. to Nfld., southw. to Tex.

Forma *arenarium* (Gates) Fernald, with prostrate stems, is the plant represented in the above collections (*See* Rhod. 37: 328. 1935).

80. ASCLEPIADACEAE
(Milkweed Family)

1. Asclepias L.
(Milkweed)

1. **A. syriaca** L. [Grh] Common Milkweed

Sandy river flats (Mat.).

Temperate American: Sask. to e. Que., southw. to Ariz., Kans., and Fla.

81. CONVOLVULACEAE
(Morning-glory Family)

1. Convolvulus (Tourn.) L.

a. Calyx enclosed by two large green bracts; stigmas oval or oblong; corolla pink, 3-5 cm. long..1. *C. sepium*, var. *communis*

a. Calyx bractless at base; stigmas filiform; corolla white, 1·5-2 cm. long...2. *C. arvensis*

1. **C. sepium** L., var. **communis** Tryon, Rhod. 41: 419. 1939. [Grh] Hedge Bindweed

Gravelly beach (Bic); river flats (Ann.; PCa.; Bon.); gravelly margin of salt marsh (Bic; Car.); brackish meadow (Bic); fields (Bic; Ann.; Srl.; Dou.; Nou.).

Temperate American: Wash to e. Que., southw. to Oreg., Ill., Ohio, Pa., and N.Y.; with the species, temperate circumpolar.

2. C. ARVENSIS L. [Gr] Field Bindweed

Ballast-filling about fish-houses (Yrk.).

European: naturalized throughout temperate N.A.

82. POLEMONIACEAE
(Phlox Family)

a. Leaves simple, sessile and entire; flowers capitate-glomerate, leafy-bracted; corolla very slender, salverform, lilac-purple to nearly white.....................1. *Collomia*

a. Leaves pinnate with 3-21 leaflets; flowers in close cymes forming a thyrse or contracted panicle; corolla blue, 1·5-2 cm. broad.........................2. *Polemonium*

1. Collomia Nutt.

1. **C. linearis** Nutt. [T] (*Gilia linearis* (Nutt.) Gray.)

Dry calcareous gravels of beaches (Bic; Pas.; Bon.; Car.; Nou.); railway ballast (Oie); habitat not stated (PCa.; GCa.).

Disjunct American: B.C. and Mack. to Minn., southw. to Calif. and Nebr.; e. Que., N.B., and N.Y.

According to Fernald (Mem. Amer. Acad. Arts and Sci. 15, No. 3: 282 (footnote 4). 1925), "Occasionally introduced in western seed, but apparently native about the trap mountains at the head of Baie des Chaleurs".

2. Polemonium (Tourn.) L.

1. P. CAERULEUM L. [Hsr] Jacob's-ladder

Waste ground (Gpe.) (distributed as *P. Van-Bruntiae* Britt. (*See* Fernald, Rhod. 51: 76 (footnote). 1949).

European: naturalized in temperate eastern N.A.

83. BORAGINACEAE
(Borage Family)

a. Flowers regular.
b. Nutlets armed with barbed prickles.
c. Nutlets depressed, spreading, covered with prickles...............1. *Cynoglossum*
c. Nutlets erect, barbed on the margins or on the back.
d. Pedicels slender, recurved or deflexed in fruit; gynobase broader than tall; style shorter than the nutlets; marginal prickles in a single row; plant rough-puberulent..2. *Hackelia*
d. Pedicels stout, erect; gynobase 5-10 times taller than broad; style surpassing the nutlets; marginal prickles in a double row; plant hispid........3. *Lappula*
b. Nutlets unarmed.
c. Nutlets attached just above the base, shining, utricular; corolla blue, 5-7 mm. long; leaves fleshy, ovate, obovate or spatulate, the upper surface becoming papillose; plants decumbent, smooth, bluish, glaucous..............4. *Mertensia*
c. Nutlets attached strictly at the base; leaves not fleshy.
d. Flowers blue, the corolla with 5 small and blunt arching appendages opposite the rounded lobes; racemes bractless.............................5. *Myosotis*
d. Flowers yellowish white, the corolla with 5 distinct pubescent crests in the throat; racemes bracted; nutlets smooth and shining, white like ivory, ovoid; leaves lanceolate, acute....................................6. *Lithospermum*

a. Flowers blue, irregular; plants very rough-bristly.
b. Corolla tube curved, the throat closed by scales; stamens included; flowers in leafy raceme-like clusters; leaves lanceolate...........................7. *Lycopsis*
b. Corolla unequally lobed, the throat dilated, open; stamens exserted; flowers showy, in short lateral clusters forming a narrow thyrse or an open panicle; stem-leaves linear-lanceolate.. 8. *Echium*

1. Cynoglossum (Tourn.) L.
(Hound's Tongue)

a. Corolla reddish purple; nutlets flat on the broad upper face; plants stout, leafy to the top, clothed with short, soft hairs.................................1. *C. officinale*

a. Corolla pale blue; nutlets compressed-pyriform-obovoid, 4-5 mm. long; plants, and especially the racemes, slender, mostly leafless above; stems villous-hispid at base, appressed-pubescent above..2. *C. boreale*

1. C. OFFICINALE L. [Hs] Hound's Tongue
Dry field (Lou.).
Eurasian: naturalized throughout temperate N.A.

2. **C. boreale** Fernald. [Hs] Wild Comfrey
Dry hillside (Bic); sandy alluvial woods (PCa.) (type station).
Disjunct American: B.C.; Mich., Ont., and e. Que., southw. to N.Y. (*See* Johnston, Contrib. Gray Herb. Harvard Univ. 70: 34. 1924).

2. HACKELIA Opiz
(Nodding Stickseed)

1. **H. americana** (Gray) Fernald. [Hs] (*Lappula deflexa,* var. *americana* (Gray) Greene; *H. deflexa,* var. *americana* (Gray) Fernald & Johnston; *See* Rhod. 26: 124. 1924; 40: 341. 1938.)

Calcicole: sea cliffs and talus (Bic; Srl.; Prr.; Lou.; Plr.; For.; Pcé.; Tra.).

Temperate American: B.C., Man., Wis., Mich., Ont., e. Que., southw. to Wash., Idaho, Nebr., Iowa, and Vt.; e. Asia; with *H. deflexa* (Willd.) Opiz, temperate circumpolar.

3. LAPPULA (Riv.) Moench.
(Stickseed)

1. L. ECHINATA L. [Hp]

Sea cliffs (Bic); sea beaches (Baie des Sables; Car.); fields (Bic; Rim.; Mét.; R. Blanche; Gro.; Trl.; Lou.; Res.).

Eurasian: naturalized throughout temperate N.A.

4. MERTENSIA Roth
(Sea Lungwort)

1. **M. maritima** L. [Hp]

Psammophilous halophyte: sea beaches (Bic; Pte. au Père; Fla.; Mét.; Baie des Sables; R. Blanche; Trl.; Marsouins; Pén.; Gpe.; Car.). General in its habitat.

Arctic circumpolar (maritime): Aleutian Is., n. coast of Alaska, Yukon, and Mack., Victoria I., Boothia Pen., Hudson Bay (Chesterfield Inlet, Southampton I., Hudson Str.), Devon, n. and s. Baffin, n. Lab., and Nfld., southw. along the coasts to Queen Charlotte Is., James Bay, and Conn.; Greenland; Iceland; Faeroes; Spitsbergen; arctic Eurasia.

5. MYOSOTIS (Rupp.) L.
(Forget-me-not)

a. Hairs of the calyx all straight; corolla 2-4 mm. broad; calyx-lobes as long as the tube or longer; stems and leaves strigose, the stems very slender and decumbent.... ....1. *M. laxa*

a. Hairs of the calyx, at least some of them, minutely hooked; stems and leaves more or less hirsute.

b. Corolla about 5 mm. broad, opening flat; calyx with only lower hairs hooked ....2. *M. sylvatica*

b. Corolla about 2 mm. broad, concave; calyx with many or most of the hairs hooked; racemes naked at the base and stalked....................3. *M. arvensis*

1. **M. laxa** Lehm. [Hpr]

Wet ground (Bic; Rim.; Mét.; Baie des Sables; R. Blanche; Mtn.; Cap.; Srl.; Yrk.; Pcé.; Bon.); gravelly river banks (Mat.); brackish marsh (Gpe.). General.

(Boreal-)temperate circumpolar: B.C. to Calif.; Ont. to Nfld., southw. to Tenn. and Ga.; Chile; Eurasia.

2. M. SYLVATICA Hoffm. [Hp] Bailey, Man. of Cult. Plants, p. 624. 1924.

River banks (Gnd.; GCa.); habitat not stated (Bic).

European: the commonly cultivated forget-me-not, escaping from cultivation in N.A.

3. M. ARVENSIS (L.) Hill. [T]

River mouth (Gnd.).

European: naturalized throughout temperate N.A.

6. LITHOSPERMUM (Tourn.) L.
(Gromwell)

1. L. OFFICINALE L. [T] Common Gromwell

Dry fields (Bic; Rim.; Mét.; Cap Chat); rocks (Bic); sea beach (Bic; Nou.).

European: naturalized in temperate eastern N.A.

7. LYCOPSIS L.
(Bugloss)

1. L. ARVENSIS L. [T]

Dry fields (Bic; Rim.; Pte. au Père; Mét.; Trl.; Lou.; For.; New Carlisle; Car.).

Eurasian: naturalized in temperate eastern N.A.

8. ECHIUM (Tourn.) L.
(Viper's Bugloss. Blue Devil)

1. E. VULGARE L. [Hs]

River gravels (Mat.); gravelly beaches (St. Omer; Car.).

European: naturalized in temperate eastern N.A.

84. LABIATAE
(Mint Family)

a. Calyx with a helmet-like crest on the upper side.......................1. *Scutellaria*

a. Calyx without a protuberance or crest.

 b. Corolla strongly 2-lipped, the upper lip convex and usually arched, sometimes with revolute margins.

  c. Upper (inner) pair of stamens longer than the lower pair.

   d. Calyx 2-lipped; corolla light blue; whorls crowded in a terminal head or spike; bracts large, pectinate with awn-pointed teeth; leaves ovate-lanceolate, sharply cut-toothed..2. *Dracocephalum*

d. Calyx not 2-lipped, often incurved.

e. Corolla whitish, dotted with purple; flowers in whorls, forming interrupted spikes or racemes; leaves ovate to oblong, cordate, deeply crenate; plants erect, whitish, densely tomentulose-canescent......................3. *Nepeta*

e. Corolla light blue; flowers in axillary, loose, few-flowered clusters; leaves round-reniform, crenate; plants trailing, green................4. *Glechoma*

c. Upper (inner) pair of stamens shorter than the lower pair.

d. Calyx distinctly 2-lipped, closed in fruit; corolla bluish, violet, or lavender; bracts large, reniform..5. *Prunella*

d. Calyx not distinctly 2-lipped, open in fruit.

e. Calyx teeth rigid and spine-tipped.

f. Leaves pinnately veined; anthers transversely 2-lipped, the smaller lip ciliate; stem swollen below the joints, bristly-hairy............6. *Galeopsis*

f. Leaves palmately veined and incised or lobed; anthers normal.......... ....7. *Leonurus*

e. Calyx teeth not spine-tipped.

f. Nutlets sharply 3-angled, truncate at apex; lower lip of the white corolla sharply constricted at base..................................8. *Lamium*

f. Nutlets obscurely angled, rounded at apex; lower lip of the purplish to pale red corolla not much constricted; angles of stem retrorsely long-hirsute, the sides short-pilose...............................9. *Stachys*

b. Corolla slightly 2-lipped or almost regular; upper lip nearly flat, erect or spreading, not arched.

c. Corolla more or less 2-lipped; upper lip erect or spreading, the lower lip also spreading.

d. Stamens curved, often converging under the upper lip of the corolla; flowers lavender to pink, in globular clusters; bracts conspicuous, setaceous-subulate; plants hairy...10. *Satureja*

d. Stamens straight, distant, often diverging, never converging; flowers purple, in terminal glomerules; stems slender, procumbent, tough, much-branched, more or less pubescent in lines..................................11. *Thymus*

c. Corolla nearly regular, all the lobes ascending; stamens diverging.

d. Fertile stamens 2; plants scentless..............................12. *Lycopus*

d. Fertile stamens 4; plants aromatic...............................13. *Mentha*

1. SCUTELLARIA L.

(Skullcap)

a. Flowers small, blue, 5-8 mm. long, in axillary 1-sided racemes.........1. *S. lateriflora*

a. Flowers solitary in the axils of the upper leaves.

b. Flowers 17-22 mm. long; stem-leaves sessile or on short petioles 1-4 mm. long; pubescence of spreading hairs.................................2. *S. galericulata*

b. Flowers 10-15 mm. long; stem-leaves on distinct petioles 8 mm. or more long; pubescence of ascending hairs................................3. *S. Churchilliana*

1. S. lateriflora L. [Hpr]

Shingle beach of marly pond (Lac Porc-Epic, Bic); river gravels (Cap Chat; Ann.; Drt.; Jhn.; Mat.); alluvial field by river (Mtn.); wet soil (Dou.; New Carlisle; Bon.; GCa.; Car.; Nou.).

(Boreal-)temperate American: B.C. to Nfld., southw. to Ariz., N. Mex., and Fla.

Forma *rhodantha* Fernald, with pink corolla (Rhod. 23: 86. 1921), has been collected from alluvial thickets and woods by Dartmouth River, the type station.

2. S. galericulata L. [Hpr] (*S. epilobiifolia* Hamil.; *See* Amer. Journ. Bot. 26:17-18. 1939.)

River gravels (Rim.; Drt.; Bon.; PCa.; GCa.; Mat.; Res.); swampy soil (Cha.; Car.; Nou.; Mar.; Zén.; Lac Ste. Anne); sea beach (Bic); brackish marsh (Bon.).

Boreal circumpolar: Alaska, Yukon, Mack. (Great Slave L.), James Bay, Mingan Is., and Nfld., southw. to Ariz., Ohio, and N.C.; Eurasia.

3. **S. Churchilliana** Fernald. [Hpr]

Swampy soil (Bic).

Temperate eastern American: e. Que., N.B., and Me.

2. DRACOCEPHALUM (Tourn.) L.

(Dragon Head)

1. **D. parviflorum** Nutt. [T]

Waste field (Bic).

Boreal American: Alaska, Yukon, sw. Mack., Hudson Bay (Churchill), Great Lakes, and e. Que., southw. to Ariz., N. Mex., Mo., and N.Y.

3. NEPETA L.

(Catnip)

1. N. CATARIA L. [Hp]

Dry slaty cliffs and fields (Bic); fields and waste places (Srl.; Drt.; Car.; Nou.).

Eurasian: naturalized throughout temperate N.A.

4. GLECHOMA L.

(Ground Ivy. Gill-over-the-ground)

1. G. HEDERACEA L. [Hpr] (*Nepeta hederacea* (L.) Trev.)

Sea ledges (Pcé.); river gravels (Pab.); alluvial ground in woods at river mouth (Mat.); roadside ditch (Bic).

Eurasian: naturalized throughout temperate N.A.

5. PRUNELLA L.

(Self-heal)

[Fernald: The indigenous varieties of Prunella vulgaris in North America; Rhod. 15: 179-186. 1913.]

a. Principal or median cauline leaves ovate or ovate-oblong, rounded at base..1. *P. vulgaris*

a. Principal or median cauline leaves lanceolate to oblong, gradually narrowed or cuneate at base..1a. *P. vulgaris*, var. *lanceolata*

1. P. VULGARIS L. [Hsr] Heal-all. Carpenter-weed

Fields (Mét.; Anse au Gascon).

European: naturalized throughout temperate N.A.

1a. **P. vulgaris**, var. **lanceolata** (Barton) Fernald.

Sea cliffs (Lbn.); river gravels (Ann.; Drt.; Jhn.; Portage; Gnd.); alluvial field by river (Mtn.); dry field (For.); roadside (Bic; Mét.; Drt.; Irn.); mossy alpine bog (Tbl.). General.

Boreal American: Alaska to Nfld., southw. to Ariz. and Fla.; e. Asia; with the species, boreal circumpolar.

Var. *lanceolata*, forma *candida* Fernald, with green calyx and white corolla (Rhod. 15: 184. 1913), has been collected from the banks of Ste. Anne des Monts River.

Var. *lanceolata*, forma *iodocalyx* Fernald, with purple calyx and bluish or violet corolla (Rhod. 15: 184. 1913), has been collected at Métis.

6. GALEOPSIS L.

(Hemp Nettle)

a. Calyx-teeth 7·5-11 mm. long; corolla white, often suffused with purple, about 2 cm. long; leaves mostly rounded at base.................................1. *G. Tetrahit*

a. Calyx-teeth in fruit 5-8 mm. long; corolla purplish, rarely white, 14-16 mm. long; leaves cuneate at base..................................1a. *G. Tetrahit,* var. *bifida*

1. G. TETRAHIT L. [T]

Fields (Bic; Cap Chat; Val.; Gpe.; Pcé.; Gnd.).

European: naturalized throughout N.A. from Alaska to Nfld. and southward.

1a. G. TETRAHIT, var. BIFIDA (Boenn.) Lej. & Court.

Fields and waste places (Bic; Mét.; Drt.; Irn.); river mouth (Gnd.).

Range of the species, but more southerly; *See* Fernald and Wiegand, Rhod. 12: 142. 1910.

7. LEONURUS L.

1. L. CARDIACA L. [Hp] Motherwort

Chicken yard (Bic).

European: widely naturalized in temperate N.A.

8. LAMIUM L.

1. L. ALBUM L. [Hp] Dead Nettle

Near houses (Bic).

European: introduced in temperate eastern N.A.

9. STACHYS (Tourn.) L.

(Hedge Nettle)

1. **S. palustris** L., var. **nipigonensis** Jennings. [Gst] (*See* Fernald, Rhod. 45: 473-475. 1943.)

Wet places (PCa.; Car.); gravelly bank (Mat.); potato field (Prr.); ballast-filling about fish-houses (Yrk.).

Boreal American: Alaska and Mack. (Great Bear L.) to e. Que., southw. to Ariz., N. Mex., Iowa, Ill., Mich., Ohio, and N.Y.; with the species, boreal circumpolar.

10. SATUREJA (Tourn.) L.

(Basil)

1. **S. vulgaris** (L.) Fritsch, var. **neogaea** Fernald, Rhod. 46: 388. 1944. [Hpr] (*S. vulgaris* of Gray's Man., ed. 7.)

Calcicole: sea cliffs (Bic; Lbn.; Pcé. (type station)); river gravels (Drt.; Pab.; GCa.; Res.); beach of marly pond (Lac Porc-Epic, Bic); clearing in woods (GCa); alpine talus (Pem.).

(Boreal-)temperate American: Man. to Nfld., southw. to Ind. and Va.; with the species, boreal circumpolar.

11. THYMUS (Tourn.) L.

(Thyme)

1. T. SERPYLLUM L. [Hpr]

Forming extensive patches on bank near river mouth (Drt.).
Eurasian: naturalized in temperate eastern N.A.

12. LYCOPUS (Tourn.) L.

a. Calyx-teeth deltoid, 4-5, shorter than the nutlets; leaves merely toothed..1. *L. uniflorus*

a. Calyx-teeth subulate, 5, longer than the nutlets; lower leaves pinnatifid..2. *L. americanus*

1. **L. uniflorus** Michx. [Hpr] Bugle-weed

Swampy soil (Bic; Ann.; Srl.; Drt.; Dou.; Cha.; Gnd.; New Carlisle; Bon.; PCa.; Nou.); brackish swamp (Bnc.).

Boreal American: B.C. to Lab. and Nfld., southw. to Oreg., Minn., and Va.; e. Asia.

2. **L. americanus** Muhl. [Hpr] Water Horehound

Gravelly river bank (Mat.); brackish marshes (Bnc.; Bon.); wet places (Bic; Rim.; Drt.; New Carlisle; PCa.; Car.).

(Boreal-)temperate American: B.C. to Nfld., southw. to Calif., Tex., and Fla.

13. MENTHA (Tourn.) L.

a. Flowers in terminal spikes, the whorls densely crowded; bracts subulate-lanceolate, ciliate, conspicuous; leaves lanceolate, sessile or short-petioled, unequally serrate..1. *M. spicata*

a. Flowers in dense axillary whorls; leaves lanceolate or oblong-lanceolate, with more or less cuneate bases, petioled, closely serrate, hairy; stems hairy on the sides...2. *M. arvensis*, var. *villosa*

1. M. SPICATA L. [Hpr] Spearmint

Fields (Bic; Sacré-Cœur; Beauséjour; Rim.; Dou.).
Eurasian: naturalized throughout temperate N.A.

2. **M. arvensis** L., var. **villosa** (Benth.) Stewart. [Hpr] (*M. arvensis*, var. *canadensis* (L.) Briq.; *See* Stewart, Rhod. 46: 333. 1944.)

Wet places (Bic; Mét.; Cap Chat; Bon. I.; Gnd.; PCa.; God.; Car.; Zén.; Irn.); maple woods (Prr.); edge of subalpine stream (Tbl.).

Boreal American: Alaska, Yukon, Mack. (Great Slave L.), s. Lab., and Nfld., southw. to Calif., N. Mex., and Va.; with the species, boreal circumpolar.

Forma *typica*, with stem in region of first-flowering inflorescence pubescent on sides and angles, is the form represented by the above collections.

Forma *glabrata* (Benth.) Stewart (*M. arvensis*, var. *glabrata* (Benth.) Fernald), with stem in region of first-flowering inflorescence glabrous on sides, minutely pubescent on angles, has been collected at Bic, Marsouins, Grande Vallée, Chandler, New Carlisle, Maria, and Matapédia.

85. SOLONACEAE
(Nightshade Family)

a. Corolla rotate; anthers connivent, opening by terminal pores; underground stem-tubers present ....1. *Solanum*

a. Corolla funnel-form or campanulate; anthers not connivent, opening longitudinally.
  b. Fruit a circumscissile capsule; flowers sessile in 1-sided leafy spikes; corolla dull yellow, strongly reticulated with purple veins; clammy-pubescent fetid herb.... ....2. *Hyoscyamus*
  b. Fruit a berry.
    c. Fruiting calyx bladdery-inflated, 5-angled and deeply 5-parted, strongly reticulated; ovary 3-5-celled; flowers pale blue; plant glabrous..........3. *Nicandra*
    c. Fruiting calyx somewhat enlarged, but closely fitted to the fruit, thin, 5-lobed, obscurely veiny; ovary 2-celled; flowers white or tinged with purple, with a pale yellow centre, woolly in the throat; plant clammy-pubescent............ ....4. *Chamaesaracha*

1. SOLANUM (Tourn.) L.
(Potato)

1. S. TUBEROSUM L. [Gst] Bailey, Man. of Cult. Plants, p. 654. 1938.
Sea beach (Fla.).
South American: widely cultivated in N.A. and sometimes escaping.

2. HYOSCYAMUS (Tourn.) L.
(Henbane)

1. H. NIGER L. [T]
Waste places (Yrk.; New Carlisle; Bon.); seashore (Car.).
European: naturalized in temperate eastern N.A.

3. NICANDRA Adans.
(Apple-of-Peru)

1. N. PHYSALODES (L.) Pers. [T]
Ballast near seminary (Rim.).
South American: introduced in temperate eastern N.A. from Peru, and escaping from gardens.

4. CHAMAESARACHA A. Gray
(Ground Cherry)

1. **C. grandiflora** (Hook.) Fernald [T] (*Leucophysalis grandiflora* (Hook.) Rydb.; *See* Rhod. 51: 82. 1949.)
Dry slaty field near barn (Bic).
Disjunct American: Sask.; Great Lakes region; e. Que. to Vt.; Andean region and China.

86. SCROPHULARIACEAE
(Figwort Family)

[Pennell: The Scrophulariaceae of eastern temperate North America; Monograph No. 1, Acad. Nat. Sci. Phil. 1935.]

a. Plants scapose, small, aquatic (chiefly maritime), with filiform-cylindric leaves 1-3 cm. long; corolla white, 3 mm. broad, nearly regular................1. *Limosella*

a. Plants with leafy stems; terrestrial.
b. Corolla spurred on the lower side at the base; leaves narrow, entire, opposite.
c. Flowers yellow, in terminal racemes; leaves pale green; plant glabrous...2. *Linaria*
c. Flowers small, purplish white; plant low, branched, glandular, found almost exclusively on cindery railroad embankments................3. *Chaenorrhinum*
b. Corolla not spurred.
c. Calyx membranaceous, ovate, flattened, veiny, much inflated in fruit, 4-toothed; corolla yellow, the upper lip arched, obtuse, flattened, with a dark tooth on each side, the lower lip 3-lobed.................................4. *Rhinanthus*
c. Calyx not inflated in fruit.
d. Bracts large, foliaceous, obtuse, often brilliantly coloured; leaves mainly entire...5. *Castilleja*
d. Bracts smaller, not coloured.
e. Stamens 2, much exposed or exserted, sterile ones wanting; corolla rotate; capsule obcordate or emarginate...............................6. *Veronica*
e. Fertile stamens 5; corolla rotate, nearly regular, yellow; leaves alternate; plants densely woolly throughout...........................7. *Verbascum*
e. Fertile stamens 4; corolla not rotate.
f. Corolla scarcely 2-lipped, the limb only slightly irregular, 10-17 mm. long, rose-purple; stamens unequal; style 6-8 mm. long............8. *Gerardia*
f. Corolla manifestly 2-lipped.
g. Stems 4-angled.
Corolla 8-10 mm. long, green or purplish, inflated, globular, the upper lip 4-lobed, the lower entire, deflexed; flowers many in a terminal panicle; a sterile stamen present as a scale on the upper lip..9. *Scrophularia*
Corolla about 25 mm. long, violet, the upper lip 2-lobed, the lower spreading, 3-lobed; flowers solitary in the leaf axils........10. *Mimulus*
g. Stems terete.
h. Sterile stamen present, shorter than the others; corolla 20-25 mm. long, white or rose-tinged, the upper lip broad and arched, the lower woolly in the throat.....................................11. *Chelone*
h. No rudimentary stamen present; corolla smaller.
i. Leaves linear-lanceolate, at least the lower entire; corolla pale greenish yellow or purplish, the upper lip compressed, straight in front, the lower erect-spreading, 3-lobed at apex....12. *Melampyrum*
i. Leaves pinnatifid or toothed.
Leaves lanceolate, pinnately parted; corolla 10-15 mm. long; greenish yellow or purplish, the margins of the upper lip not recurved...13. *Pedicularis*
Leaves small, ovate to ovate-orbicular, toothed; corolla 3-9 mm. long, white to purplish, the margins of the upper lip recurved...14. *Euphrasia*

1. Limosella L.
(Mudwort)

1. **L. subulata** Ives. [T] (*L. aquatica*, var. *tenuifolia* Torr.; *See* Fernald, Rhod. 20: 160-164. 1918.)

Halophyte: brackish waters of river estuaries (Rim.; Drt.; Bon.; New Carlisle).

Boreal eastern American (maritime): e. Que. to Lab. and Nfld., southw. along the coast to N.J.

2. Linaria Mill.
(Toadflax. Butter-and-eggs)

1. L. VULGARIS Hill. [Hpr]

Fields (Bic; Rim.; Pcé.; Car.); dry gravels of spit (Car.); river gravels (Mat.); sea beach (Mét.). General.

Eurasian: naturalized throughout temperate N.A.

3. CHAENORRHINUM Reich.
(Small Snapdragon)

1. C. MINUS (L.) Lange [T] (*Linaria minor* (L.) Desf.)
Railway ballast (Mtn.; Mat.; Sayabec); field (Bon. I.).
European: naturalized in temperate eastern N.A.

4. RHINANTHUS L.
(Yellow Rattle)

a. Branches of the stem, when present, short and scarcely developed at flowering time, later, if elongating, bearing only reduced flowers; corolla yellow.
  b. Upper part of stem black-lineolate; upper lip of corolla with depressed rounded purplish teeth, the lateral lobes of the lower lip with a black spot at base; calyx glabrous, green, often black-striate; bracts glabrous............1. *R. Crista-galli*
  b. Stem green, without dark lines; corolla yellow throughout; calyx greenish yellow, often tinged with bronze, glabrescent, the margins ciliate; bracts scabrous...... ....2. *R. groenlandicus*

a. Branches of the stem in well-developed plants elongate at flowering time, their flowers like those of the primary inflorescence.
  b. Upper part of stem black-lineolate; corolla canary-yellow, turning brownish, the teeth of the upper lip blue-grey, the lower lip with brown markings; calyx and bracts purple-tinged...3. *R. stenophyllus*
  b. Stem green, without dark lines; corolla light yellow, the teeth of the upper lip whitish yellow; calyx yellowish green; bracts pale green.............4. *R. Kyrollae*

1. R. CRISTA-GALLI L. [T]

Dry fields (Bic); gravels of spit (Car.); calcareous soil (Pcé.); springy banks (Trl.); seashore (Baie des Sables); river estuary (Bon.); alpine schists (Bln.). General.

European: naturalized in eastern N.A. from e. Que. to s. Lab. and Nfld., southw. to N.Y.

2. **R. groenlandicus** Chabert. [T] (*R. oblongifolius* Fernald; *See* Pennell, p. 490. 1935.)

Sea ridges (Bic; Ste. Luce); turfy headland (Pcé.); alpine meadow (Tbl.) (type station for *R. oblongifolius*); edge of alpine lake (Alb.); turfy alpine slopes (Log; Ftn.; Pem.).

(Arctic-)boreal American, alpine: Alaska (Seward Pen.), Yukon, Mack., ?Somerset I., Hudson Bay (w. and e. coasts), Ungava Bay, n. Lab., southw. in the mts. to N.Y.; s. Greenland; Iceland; transgressing into w. Europe and e. Asia.

3. R. STENOPHYLLUS (Schur) Schinz & Thelling. [T]

Boggy meadows (Pcé.); river gravels (Yrk.); thickets (Drt.).

European: naturalized in temperate eastern N.A.

4. **R. Kyrollae** Chabert. [T]

Calcicole: dry slaty field (Bic); sea ledges (Pcé.; Bon. I.); open places (Drt.; Gnd.; Bon.; PCa.; GCa.; Mat.). General.

Disjunct American: Wash., Alb., and Man., southw. to Colo.; e. Que. to Lab., southw. to N.S.

5. Castilleja Mutis
(Painted Cup)

1. **C. septentrionalis** Lindl. [Hp] (*C. pallida,* var. *septentrionalis* (Lindl.) Gray.)

Calcicole: river gravels (Cld.; Gnd.; Bon.; GCa.; Mat.); sea cliffs (Pcé.; Bon. I.); calcareous alpine meadow (Tbl.); alpine meadows (Tbl.; Log.; Ftn.); alpine schists (Bln.).

Alpine serpentine barrens (Alb.); gravel outwash plain below Mt. Albert (R. du Diable).

Arctic American, alpine: Mack. (Great Bear L.), Alb., S. Dak. (Black Hills), Great Lakes region, James Bay, Hudson Bay (n. Que.), Ungava Bay, s. Baffin, n. Lab., Nfld., and Gaspe, southw. in the mts. to Utah, Colo., and N. Eng.

6. Veronica L.
(Speedwell)

a. Main stem terminating in an inflorescence; upper bract-leaves alternate.
- b. Plant perennial from rhizomes; flowers crowded in definite racemes.
  - c. Capsules wider than long, strongly flattened, the lowermost on pedicels nearly or quite as long as the capsules; inflorescence obviously a raceme; style slightly shorter than the capsule; lower leaves petioled; plants repent, ascending at the apex.
    - d. Stem throughout and pedicels minutely pubescent with upcurved hairs; corolla about 2 mm. long, white or whitish with violet lines on the back; capsules mostly 3-4 mm. wide .... 1. *V. serpyllifolia*
    - d. Rhachis and pedicels finely pubescent with longer, mostly spreading hairs; corolla about 3 mm. long, pale violet with deeper violet-blue lines on the back; capsule mostly 4-5 mm. wide .... 2. *V. humifusa*
  - c. Capsules longer than wide, moderately compressed, in a dense, ellipsoid, spike-like raceme, obovate, notched, 4-6 mm. high, conspicuously villous with chiefly round-tipped trichomes; upper internodes of stem spreading-long-villous; ciliation of sepals long-villous; leaves sessile, entire or crenulate .... 3. *V. alpina,* var. *unalaschcensis*
- b. Plants annual, fibrous rooted; flowers in the axils of most of the leaves.
  - c. Capsule lobes rounded in profile; style shorter than the capsule; sepals ovate; corolla scarcely exceeding the sepals; capsule slightly and narrowly notched .... 4. *V. agrestis*
  - c. Capsule lobes acutish in profile; style as long as the capsule; sepals narrowly ovate; corolla much exceeding the sepals; capsule widely notched .... 5. *V. persica*

a. Main stem not terminating in an inflorescence; leaves opposite throughout; flowers in axillary racemes.
- b. Leaves sessile, linear or linear-lanceolate, acute, remotely denticulate; racemes very slender and zigzag, the flowers few and scattered, on elongated spreading or reflexed pedicels; capsule very flat, much broader than long, notched at both ends; plants smooth .... 6. *V. scutellata*
- b. Leaves short-petioled, ovate, oblong, or obovate.
  - c. Capsules turgid, orbicular, many-seeded; mature pedicels very slender, 6-11 mm. long; leaves lanceolate, acute or acutish; plants glabrous .... 7. *V. americana*
  - c. Capsules strongly flattened, obovate-triangular, broadly notched, several-seeded; pedicels shorter than the calyx; leaves obovate-elliptical or wedge-oblong, obtuse; plants pubescent .... 8. *V. officinalis*

1. V. SERPYLLIFOLIA L. [Hp] Thymeleaf Speedwell

Conifer woods (Bic); limestone sea ridges (Bic); wet places (Rim.; Mét.; Cap Chat; For.; Bon. I.; Gnd.); subalpine swamp (Tbl.).

Eurasian: introduced throughout temperate N.A.

2. **V. humifusa** Dickson. [Hp]

Springy ground (Bic; Mtn.; Cld.; Pcé.; Gnd.; New Richmond; GCa.; Nou.); wet alpine amphibolite rocks (Alb.); alpine meadows (Tbl.; Log.; Mtt.; Ftn.).

Boreal circumpolar, alpine: Aleutian Is. and Alaska to Lab. and Nfld., southw. in the mts. to Mex. and N.Y.; Eurasia.

3. **V. alpina** L., var. **unalaschcensis** Cham. & Schl. [Hpr] (*V. Wormskjoldi* R. & S.; *V. alpina*, var. *Wormskjoldi* (R. & S.) Hook.; *See* Fernald, Rhod. 41: 447-457. 1939.)

Calcareous alpine meadow (Tbl.); alpine meadows (Log.; Ftn.); subalpine woods (Alb.; Tbl.); cool ravine (Lyl.); alpine schists (Mtt.).

Crevices of alpine serpentine barrens (Alb.).

Arctic American, alpine: Aleutian Is., Alaska, Yukon, Mack. (Great Bear L.), southw. in the mts. to Colo.; Hudson Bay (w. and e. coasts); s. Baffin, Akpatok I., n. Lab., and Nfld., southw. in the mts. to N.H.; w. and e. Greenland; Pyrenees; with the species, arctic circumpolar.

4. V. AGRESTIS L. [T]

Gravelly beach at river mouth (Gnd.).

European: naturalized in temperate eastern N.A.

5. V. PERSICA Poir. [T] (*V. Tournefortii* Gmel.)

Habitat not stated (Gpe.).

Eurasian: naturalized throughout temperate N.A.

6. **V. scutellata** L. [Hpr] Marsh Speedwell

Swampy soil (Bic; Rim.; Cap Chat; Ann.; Marsouins; Val.; Dou.; New Carlisle; Bon.; New Richmond).

Boreal circumpolar: Alaska, Yukon, Mack. (Great Slave L.), n. Ont., James Bay, Lab., and Nfld., southw. to Calif., Colo., and Va.; Iceland; Eurasia.

7. **V. americana** (Raf.) Schwein. [Ch (passive)] Brooklime

Swampy soil (Bic; Baie des Sables; Cap Chat; Cld.; Prr.; Ren.; Mad.; Gnd.; Cha.; Irn.); edge of subalpine lake (Lac Ste. Anne, Tbl.); subalpine slopes (Alb.).

Boreal American: Aleutian Is., Alaska, Yukon, James Bay, Nfld., southw. to Calif., Mex., and N.C.; e. Asia.

8. V. OFFICINALIS L. [Ch (passive)] Common Speedwell

Dry roadside (Cha.; New Carlisle).

Eurasian: introduced throughout temperate N.A.

7. VERBASCUM (Tourn.) L.
(Mullein)

1. V. THAPSUS L. [Hs] Common Mullein

Roadside cliffs of limestone (Mat.); beach (Car.); fields (Rim.; New Carlisle; Bon.).

Eurasian: naturalized throughout temperate N.A.

8. GERARDIA (Plumier) L.

1. **G. paupercula** (Gray) Britton, var. **borealis** Pennell. [T] (*See* Pennell, pp. 433-436.)

River shores (Bic).

Temperate eastern American: Minn. to Quebec, chiefly in the St. Lawrence Valley and in the Upper Mississippi Valley; differs from the species chiefly in its shorter corolla and style.

9. SCROPHULARIA L.

(Figwort)

1. **S. lanceolata** Pursh. [Hp] (*S. leporella* Bicknell.)

Rich woods (Rim.).

Temperate American: B.C. to e. Que., southw. to Calif., N. Mex., Kans., Mo., and Va.

10. MIMULUS L.

(Monkey Flower)

1. **M. ringens** L. [Hpr]

Beach of marly pond (Lac Porc-Epic, Bic); river gravels (Rim.); river estuary (Bon.); wet soil (Mar.).

Boreal American: Man., James Bay, e. Que., southw. to Colo., Ala., and Ga.

11. CHELONE L.

(Turtlehead. Snakehead)

a. Uppermost leaf-blades decidedly smaller than those of the middle part of the stem, like them clearly narrowed to the petioles..............................1. *C. glabra*

a. Uppermost leaf-blades little or no smaller than those of the middle part of the stem, rounded to the petioles..................................1a. *C. glabra,* var. *dilatata*

1. **C. glabra** L. [Hp]

Swampy soil (Bic; PCa.; Cha.; New Richmond; Lac Matapédia). General.

(Boreal-) temperate eastern American: Ont. and Minn. to Nfld., southw. to Ala. and Ga.; the whole species (including varieties), boreal American.

1a. **C. glabra,** var. **dilatata** Fern. & Wieg., Rhod. 14: 226. 1912.

Swampy soil (Cap.; PCa.; Lac Matapédia).

(Boreal-) temperate eastern American: e. Que. to Nfld., southw. to N.Y., and in the mts. of N.C.

12. MELAMPYRUM L.

(Cow-wheat)

a. Stem simple or nearly so, 0·5-2 dm. high; foliage leaves and bracts linear, 1-5 mm. wide, entire or the uppermost bracts rarely toothed at the base..........1. *M. lineare*

a. Stem bushy-branched, 2-5 dm. high; foliage leaves 2-10 mm. wide; bracts up to 20 mm. wide, some or all sharply toothed at the base....1a. *M. lineare,* var. *americanum*

1. M. lineare Desr. [T] *M. lineare,* var. *lineare* (Desr.) Beauverd; *See* Fernald, Rhod. 44: 446-452. 1942.)

Conifer woods (Bic; Rim.; Pte. au Père; R. Blanche; Dou.; Gnd.; New Carlisle); edge of alpine pond (Alb.); subalpine conifer woods (Str.). General in its habitat.

Boreal American: B.C. to s. Lab. and Nfld., southw. to n. Idaho, n. Mont., n. Wis., n. Mich., Vt., and N.H.

1a. **M. lineare,** var. **americanum** (Michx.) Beauverd. (*See* Fernald, Rhod. 44: 446-453. 1942.)

Conifer woods (Bic; Yrk.); sandy wooded barachois (Jhn.); dry stony barren (Anse aux Canards).

Somewhat more southern than the species.

13. PEDICULARIS L.

(Lousewort)

a. Stems freely branching, 2-6 dm. high; leaves lanceolate, with small crenate oblong segments; flowers purplish or rose-colour, axillary and terminal........1. *P. palustris*

a. Stems simple, 3-10 cm. high; leaves linear-oblong, the lobes incised-serrate; flowers greenish yellow, in a short, terminal, spike-like raceme.................2. *P. flammea*

1. P. palustris L. [T]

Calcicole: swampy edge of marly pond (Lac Flacon, Bic).

Halophyte: tidal marshes (Sacré-Cœur; Pte. au Père; Mtn.; Ann.; Newport); salt marsh (Bnc.).

Amphi-Atlantic: e. Que. and Nfld.; Faeroes; Europe; closely related to *P. parviflora* Sm. of northwestern America and Siberia.

2. P. flammea L. [Hs] Rydberg, p. 800.

Calcicole: in sheltered pockets on abrupt western alpine slopes (Tbl.) (with *Saxifraga nivalis* var. *tenuis, Carex rupestris, Pyrola grandiflora, Campanula uniflora,* and *Senecio pauciflorus*); alpine schists (Log.).

Arctic ?circumpolar, alpine: Alaska (Seward Pen.), central Yukon, Mack. (Great Bear L.), Hudson Bay (Chesterfield Inlet, Southampton I., Hudson Str.), Devon, n. and s. Baffin, Melville, n. Que., n. Lab., and Nfld., southw. to James Bay, and in the mts. to B.C. and Gaspe; w. and e. Greenland; Iceland; arctic and alpine Europe (gap in Asia).

14. EUPHRASIA L.

(Eyebright)

[Fernald and Wiegand: The genus Euphrasia in North America; Rhod. 17: 181-201. 1915.]

a. Leaves glandular; capsule exceeding the calyx-teeth and the subtending bract.... ....1. *E. Pennellii*

a. Leaves not glandular.

  b. Upper lip of corolla very shallowly 2-lobed, the lobes very short, rounded, entire, narrowly revolute, rarely erect; lower lip scarcely fan-shaped, not exceeding the upper; flowers very small, 2·2-4 (rarely 4·8) mm. long; bracts with blunt teeth.

    c. Inflorescence capitate or subcapitate, the flowers closely crowded, only the 1-4 lowest pairs of bracts becoming slightly remote in maturity.

d. Corolla whitish to lilac; nodes below the head 2-5; leaves pubescent...2. *E. Oakesii*

d. Corolla deep brownish purple or chocolate-colour; nodes below the head 4-7; leaves glabrous...3. *E. Williamsii*

c. Inflorescence becoming loose and elongate, the flowers or capsules scattered, the mature spike with many remote bracts.

d. Leaves glabrous on both surfaces; corolla deep purple to cream-colour...4. *E. purpurea*

d. Leaves pubescent on both surfaces; corolla deep purple with dark lines...4a. *E. purpurea*, var. *Randii*

b. Upper lip of corolla plainly 2-lobed, the lobes somewhat reflexed from the base (not revolute), truncate, undulate to coarsely 3-toothed; lower lip in larger forms fan-shaped, spreading and very conspicuous; flowers 4-10 mm. long; bracts with acute or acuminate, rarely obtuse, teeth.

c. Bracts with acute teeth; corolla 5-7 mm. long, white with pale lavender veins, the lobes of the lower lip nearly parallel; leaves conspicuously pubescent, the cauline ones bluntly toothed...5. *E. arctica*

c. Bracts with subulate or bristle-tipped teeth; leaves pubescent or glabrous.

d. Spikes comprising the larger part of the plant, beginning near the base of the stem and branches.

e. Corolla 5-6·5 mm. long, with pale lavender or bluish lines and yellow eye; lateral lobes of lower lip not strongly spreading.............6. *E. canadensis*

e. Corolla 6-8 mm. long, with dark purple lines; lateral lobes of lower lip wide-spreading.

f. Bracts glabrous...7. *E. rigidula*

f. Bracts pubescent...8. *E. tatarica*

d. Spikes occupying only the upper half or third of the stem and branches; corolla 7-9 mm. long, with dark purple lines; lower lip with wide-spreading lateral lobes...9. *E. americana*

1. **E. Pennellii** Callen, Journ. Bot. 78: 214. 1940. [T]

Calcicole: grassy bluffs (Mar.).
Local endemic.

2. **E. Oakesii** Wettstein. [T]

Calcicole: sea cliffs and talus (Srl.; Prr.); alpine schists (Log.; Pem.; Ftn.).

Gulf endemic, alpine: e. Que. to s. Lab. and Nfld., southw. to Gaspe and in the mts. to N.H.

3. **E. Williamsii** Robinson. [T]

Calcicole: alpine schists (Log.; Pem.; Ftn.; Col.).
Gulf endemic, alpine: Gaspe to Nfld., southw. in the mts. to N.H.

4. **E. purpurea** Reeks. [T]

Calcicole: sea cliffs (Bon. I.).
Halophyte: brackish marshes (Jhn.; Dou.; Mal.).
Gulf endemic: Gaspe to s. Lab. and Nfld., southw. to R.I.

4a. **E. purpurea,** var. **Randii** (Robinson) Fern & Wieg. (*E. Randii* Robinson.)

Calcicole: open sterile soil (Bon. I.).
Gulf endemic: Gaspe to s. Lab. and Nfld., southw. to Me.

5. **E. arctica** Lange. [T] (*See* Fernald, Rhod. 35: 301-306. 1933.)

Calcicole: sea cliffs (Srl.; Prr.; Lou.; Plr.; For.; Gpe.; Pcé.; Bon. I.; Nou.); river ledges (Bon.); marly bogs at river mouth (Gnd.); dry open soil (Gnd.).

Psammophilous halophyte: gravelly beach (Pas.); river estuary (Bon.).

Arctic ?circumpolar: gap in western America; Keewatin, Baffin, n. Lab., and Nfld., southw. to Minn. and e. Que.; Greenland; Iceland; Faeroes; n. Europe; absent from Asia.

6. **E. canadensis** Townsend. [T]

Calcicole: sterile fields and dry open places (Bic; Rim.; R. Blanche; Lou.; Anse Jersey; Lbn.; Pcé.; Bon. I.; Anse au Gascon; New Richmond; Car.; Nou.; Zén.); river ledges (Mat.; Res.).

Temperate eastern American: e. Que. and Mingan Is. to N.H.

7. **E. rigidula** Jordan [T] (*E. stricta* Host; *See* Fernald, Rhod. 35: 306 and 399. 1933.)

Calcicole: sea cliffs (Pcé.); damp hollow near river mouth (Gnd.); turfy ground (New Carlisle); gravelly soil (Mar.).

Amphi-Atlantic: e. Que. to Nfld., southw. to N.Y.; Europe.

8. E. TATARICA Fischer. [T] (*E. stricta*, var. *tatarica* (Fischer) Fern. & Wieg.)

Calcicole: sea cliffs (Pcé.; Bon. I.; Dou.; New Carlisle); dry open soil at river mouth (Gnd.).

Eurasian: possibly introduced into e. Que. and s. Lab., but having the appearance of an indigenous plant.

9. **E. americana** Wettstein. [T]

Calcicole: sterile soil (Bon. I.); sea cliffs (Pcé.; Pas.); fields (Val.); conifer woods on limestone cliffs (Bic); gravel beaches (Pas.; Bon.; Car.).

(Boreal-)temperate eastern American: e. Que. to Nfld., southw. to Me.

87. LENTIBULARIACEAE
(Bladderwort Family)

a. Scape 1-flowered; corolla violet-purple, the upper lip 2-lobed, recurved-spreading, the lower 3-lobed, larger; spur 4-8 mm. long; terrestrial plants with entire, soft-fleshy, greasy leaves in a basal rosette..........................1. *Pinguicula*

a. Scape 1-few-flowered; corolla yellow, the upper lip erect, entire, the lower larger, 3-lobed, spurred at the base, with a prominent projecting palate; aquatic or mud plants with dissected scattered leaves, which are bladder-bearing........2. *Utricularia*

1. Pinguicula L.
(Butterwort)

1. **P. vulgaris** L. [Hr]

Calcicole: wet sea cliffs (Mét.; Srl.; Mrn.; Marsouins; Prr.; Plr.; Mad.; Ros.; Pcé.; Bon. I.); cliffs above lake (Lac Pleureuse); river ledges (Ann.; Lou.; Cld.; Mad.; Drt.; Jhn.; Gnd.; Pab.; Bon.; PCa.; Mat.); calcareous alpine cliffs (Tbl.).

Arctic circumpolar, alpine: Aleutian Is., Alaska (Seward Pen.), Mack. (Mack. R. Delta, Great Bear L., Coronation Gulf), Hudson Bay (w. and e. coasts), s. Baffin, n. Lab., and Nfld., southw. to Wash., Mont., the Great Lakes, James Bay, and Vt.; w. and e. Greenland; Iceland; Faeroes; arctic and alpine Eurasia.

2. Utricularia L.
(Bladderwort)

a. Stems, exclusive of the long erect peduncle, very short, submerged in the mud; some leaves capillary, divided, root-like and bladder-bearing, others subulate, undivided, green and grass-like; flowers large and showy; spur long and sharp......1. *U. cornuta*

a. Stems slender, creeping or floating; leaves forked or divided, scattered, bladder-bearing; flowers large or small, the spur mostly blunt.

  b. Leaves 20-50 mm. long, crowded, 2-3-pinnately divided; flowers 10-20 mm. wide, the corolla closed, with reflexed sides..............................2. *U. vulgaris*

  b. Leaves less than 20 mm. long, dichotomously branching.

    c. Branches strongly dimorphous, the bladders on almost leafless ones; leaves sessile, several times forked, the divisions broad and flat; bladders 2·5-4 mm. long; corolla 10-20 mm. wide, the lips very unequal in length; spur appressed to and nearly as long as the very broad upper lip.............3. *U. intermedia*

    c. Branches all similar, equally bladder-bearing, the divisions more capillary; bladders 1·5-1·8 mm. long; corolla 4-8 mm. wide, gaping, the upper lip not longer than the depressed palate; spur almost obsolete..............4. *U. minor*

1. **U. cornuta** Michx. [HH] Horned Bladderwort

Bogs (Bic; New Carlisle; Gnd.; Nou.; Albertville).

(Boreal-)temperate eastern American: Minn. to Mingan Is. and Nfld., southw. to Tex. and Fla.

2. **U. vulgaris** L. [HH] (*U. vulgaris*, var. *americana* Gray; *U. macrorhiza* LeConte; *See* Rossback, Rhod. 41: 118. 1939; Fernald, Rhod. 43: 642-644. 1941.) Great Bladderwort

Ponds (Oie; Nou.; Zén.); river edge (Mad.).

Boreal circumpolar: Alaska (Seward Pen.), Yukon, Mack. (Mack. R. Delta, Great Bear L.), n. Sask., James Bay, s. Lab., and Nfld., southw. to Lower Calif., Ariz., N. Mex., Tex., La., and Fla.; Faeroes; Eurasia.

3. **U. intermedia** Hayne. [HH]

Bogs (Bic; Rim.; Yrk.; Dou.; New Carlisle; Gnd.).

(Arctic-)boreal circumpolar: Alaska (Seward Pen.), Mack. (Mack R. Delta, Great Bear L.), Hudson Bay (e. and w. coasts), Ungava Bay, Nfld., southw. to Calif. and N.J.; w. Greenland; Iceland; Eurasia.

4. **U. minor** L. [HH] Lesser Bladderwort

Marl pond at river mouth (Gnd.).

Boreal circumpolar: Yukon, Mack. (Great Bear L., Great Slave L.), James Bay, s. Lab., and Nfld., southw. to Calif., Colo., Ind., Ohio, Pa., N.Y., and Conn.; w. Greenland; Iceland; n. Eurasia.

88. OROBANCHACEAE
(Broom-rape Family)

1. Orobanche L.
(Broom-rape)

1. **O. uniflora** L., var. **terrae-novae** (Fernald) Achey. [Grh] (*O. terrae-novae* Fernald, Rhod. 28: 235. 1926; *See* Achey, Bull. Torrey Bot. Cl. 60: 444. 1933.)

Conifer woods by river (Ann.; Gnd.); woods (Bic); alpine meadow (Tbl.).

Gulf endemic, alpine: e. Que., Anticosti, Nfld.; with the species, boreal American.

89. PLANTAGINACEAE

(Plantain Family)

a. Flowers monoecious, the staminate solitary and peduncled, the pistillate sessile among the linear leaves; ovary 1-celled, 1-seeded, indehiscent; aquatic plants..1. *Littorella*

a. Flowers perfect, in spikes or heads; capsule 2-celled, 2-several-seeded, opening transversely so that the top falls off like a lid; terrestrial plants...............2. *Plantago*

1. Littorella L.

(Plantain Shore-weed)

1. **L. americana** Fernald, Rhod. 20: 62. 1918. [HH]

Subalpine lake (Lac Ste. Anne, Tbl.).

(Boreal-)temperate eastern American: Minn. to Nfld., southw. to Me. and Vt.

2. Plantago L.

(Plantain)

[Fernald: The maritime plantains of North America; Rhod. 27: 93-104. 1925.]

a. Leaves linear to subterete, fleshy, obscurely ribbed.

b. Bracts or calyx-segments or both minutely ciliolate, the former rarely prolonged and with only a slight keel; spikes usually dense to the base, the longest rarely 0·6-1 dm. long.

c. Leaves linear, erect or strongly ascending, entire, usually shorter than the scapes ....1. *P. juncoides*, var. *decipiens*

c. Leaves lanceolate to oblanceolate, depressed or wide-spreading, often toothed, usually equalling or exceeding the scapes........1a. *P. juncoides*, var. *laurentiana*

b. Bracts and calyx-segments glabrous, the former often with prolonged tips and with thick or gibbous keel; spikes often remotely flowered at base, in large plants becoming 0·6-2 dm. long.

c. Leaves mostly erect or strongly ascending, in mature plants up to 12 mm. broad, usually shorter than the mature spikes; spikes 3-20 cm. long, often remotely flowered at base ....2. *P. oliganthos*

c. Leaves mostly loosely spreading or arching, slender, 0·5-4 mm. wide, mostly overtopping the spikes; spikes 0·5-7 cm. long; scapes depressed or arched-ascending..2a. *P. oliganthos*, var. *fallax*

a. Leaves ovate, lanceolate, or oblong.

b. Capsules 8-18-seeded, ovoid, circumscissile near the middle; seeds angled, reticulated; blade broad-elliptic to cordate-ovate, thick and leathery, the broad petiole channelled..3. *P. major*

b. Capsule 2-4-seeded.

c. Leaves broadly oblong or elliptic, finely canescent; seeds slightly concave or flat on the face; flowers fragrant..................................4. *P. media*

c. Leaves oblong-lanceolate, usually with a mass of yellowish wool at the base; capsule ovoid, circumscissile much below the middle; seeds plump; maritime plants..5. *P. eriopoda*

c. Leaves narrowly oblong-lanceolate or linear-lanceolate; capsule oblong, obtuse, 2-seeded, the seeds hollowed on the face........................6. *P. lanceolata*

1. **P. juncoides** Lam., var. **decipiens** (Barneoud) Fernald. [Hr] (*P. decipiens* Barneoud.) Seashore Plantain

Calcicole: sea cliffs and ledges (Bic; Prr.; Val.; Ros.; Gpe.; Pcé.; Bon. I.; Bon.).

Halophyte: salt marshes (Bic; Gnd.).

Psammophilous halophyte: gravel beach (Car.); ledges within reach of spray (Bic; Pte. au Père; Mét.; R. Blanche; Gro.; Trl.; Srl.; Plr.; Cld.; For.).

Boreal eastern American (maritime): e. Que. to s. Lab. and Nfld., southw. along the coast to N.J.; the whole species arctic circumpolar (gap in Asia).

Var. *decipiens*, forma *pygmaea* (Lange) Rousseau, with scapes only 1-7 cm. high, spikes 0·5-2 cm. long (*See* Fernald, Rhod. 27: 99. 1925; Rousseau, Contrib. Inst. Bot. Univ. Montréal, No. 44: 59. 1942), has been collected at Bic, Grande Vallée, Cloridorme, Bonaventure Island, and Paspébiac. This is the arctic form: Keewatin, Baffin, Hudson Bay, Lab., and Nfld., southw. to Me.; Greenland; Iceland; arctic Norway.

1a. **P. juncoides,** var. **laurentiana** Fernald, Rhod. 27: 102. 1925.

Calcicole: sea cliffs and ledges (Trl.; Manche d'Epée; Mad.).

Psammophilous halophyte: gravel beach (Ste. Luce).

(Boreal-) temperate eastern American (maritime): e. Que. and Nfld. to N.S.

2. **P. oliganthos** R. & S. [Hr]

Psammophilous halophyte: sea ledges within reach of spray (Bic); brackish shores (Yrk.; Jhn.).

Disjunct American (maritime): Man.; e. Que. and Nfld., southw. to N.Y.

2a. **P. oliganthos,** var. **fallax** Fernald, Rhod. 27: 103. 1925.

Psammophilous halophyte: gravel beach (Car.).

Boreal eastern American (maritime): Gaspe to Lab. and Nfld., southw. to Me.

3. **P. major** L. [Hr] Common Plantain

Fields and roadsides (Bic; Irn.); gravelly river banks (Drt.; Bon.; Mat.); gravels of spit (Cha.). General.

(Boreal-)temperate circumpolar: Aleutian Is., B.C., and Mack. to Nfld., southw. to Calif. and Fla.; Iceland; Faeroes; Eurasia.

Forma *intermedia* (Gilib.) Pilger, with closely rosulate, lance-ovate to narrowly elliptic leaves, has been collected from waste ground at Gaspe.

4. P. MEDIA L. [Hr]

In grass near hotel (Gpe.).

Eurasian: adventive in temperate N.A.

5. **P. eriopoda** Torr. [Hr]

Halophyte: salt marshes (Mtn.; Cap Chat; Ann.; Trl.; Lou.; Mad.; Tng.; Drt.; Jhn.).

Disjunct American (maritime): arctic coast of N.W.T. to Colo. (a species primarily of the alkaline Canadian Plains); Côte Nord, Anticosti, and Gaspe.

6. **P. LANCEOLATA** L. [Hr] Rib-grass. Buckhorn
Fields (Rim.; Gpe.; Bon. I.); river gravels (Mat.).
Eurasian: naturalized throughout temperate N.A.

90. RUBIACEAE
(Madder Family)

a. Leaves in whorls; fruit dry, of 2 twin carpels..........................1. *Galium*
a. Leaves opposite; fruit a many-seeded capsule; corolla light blue with a yellowish eye ....2. *Houstonia*

1. GALIUM L.
(Bedstraw. Cleavers)

a. Ovary and fruit covered with hooked or inturned hairs.
  b. Stem smoothish; plants perennial.
    c. Leaves in 4's, orbicular to oblong-ovate, thin, not cuspidate; plants erect..........................1. *G. kamtschaticum*
    c. Leaves in 6's, elliptic-lanceolate, cuspidate; plants usually prostrate..........................2. *G. triflorum*
  b. Stem very prickly backward, weak and reclining; leaves about 8 in a whorl, oblanceolate; annuals..........................3. *G. Aparine*
a. Ovary and fruit smooth or almost so.
  b. Leaves cuspidate-tipped.
    c. Leaves in 6's on the main stem, in 4's or 5's on the branches, elliptic, with almost prickly margins and midrib; stem much-branched, retrorse-scabrous with hooked bristles..........................4. *G. asprellum*
    c. Leaves in 8's on the main stem, in 6's on the branches, narrowly oblanceolate; plant slightly rough..........................5. *G. Mollugo*
  b. Leaves obtuse, or at least not cuspidate-tipped.
    c. Corolla 4-parted; leaves in whorls of 4.
      d. Flowers numerous in terminal cymes, the pedicels becoming strongly divaricate; fruit lunate in cross-section, 2·5-3·5 mm. broad; plants blackening in drying..........................6. *G. palustre*
      d. Flowers bright white, in compact, many-flowered, terminal panicles; fruit glabrous or glabrate, about 2 mm. broad; leaves linear-lanceolate, thick, 2-6 cm. long; stems stout, erect, strict........7. *G. boreale*, var. *hyssopifolium*
      d. Flowers 2 or 3 in terminal clusters, the pedicels scarcely divaricate even in fruit; fruit 1-1·5 mm. broad; leaves soon reflexed...........8. *G. labradoricum*
    c. Corolla 3-parted.
      d. Stem indistinctly retrorse-scabrous.
        e. Flowers solitary or in pairs, on capillary, scabrous, arcuate pedicels; stems slender and weak, very freely branching, forming dense mats....9. *C. trifidum*
        e. Flowers in terminal cymes of 2 or 4, on thick, straight, and glabrous pedicels; stems stouter, suberect..........................10. *G. tinctorium*
      d. Stems, pedicels, and leaves glabrous.
        e. Otherwise as in No. 9, except for slightly larger fruit (1·5-1·75 mm. broad) ....9a. *G. trifidum*, var. *halophilum*
        e. Stems sparingly branched, suberect, 5-15 cm. high; flowers lateral, solitary or in pairs, on arcuate pedicels as long as or longer than the leaves; fruits 1·7-2 mm. broad..........................11. *G. Brandegeei*

1. **G. kamtschaticum** Steller. [Hpr]

Subalpine conifer woods (Alb.; Bln.); alpine meadow (Tbl.; Log.; Mtt.).

Disjunct American, alpine: Aleutian Is. and Unalaska to Wash.; Lake Superior; e. Que. to Nfld., southw. in the mts. to N.Y.; e. Asia.

2. **G. triflorum** Michx. [Hp] Sweet-scented Bedstraw

Conifer woods (Bic; Rim.; Mét.; Mtn.; Ann.; Prr.; Lou.; Ren.; Gpe.; Pcé.; Bon. I.; PCa.; Irn.); subalpine woods (Bln.; Lyl.). General.

Boreal circumpolar: Aleutian Is., Alaska, Yukon, n. Alb., Sask., Man., James Bay, s. Lab., and Nfld., southw. to Calif., Colo., La., and Fla.; s. Greenland; Eurasia.

3. **G. Aparine** L. [T] Cleavers. Goose Grass

Burned ground (Car.); gravelly beach (Car.); habitat not stated (Rim.; Lou.).

Temperate circumpolar: B.C. to e. Que., southw. to Calif., Tex., and Fla.; Eurasia.

4. **G. asprellum** Michx. [Hp] Rough Bedstraw

Wet places (Mét.; Cap Chat; Dan.; Bon.; PCa.; Nou.; Mat.).

(Boreal-)temperate eastern American: Minn. to Nfld., southw. to Nebr. and N.C.

5. G. MOLLUGO L. [Hp] Baby's Breath

Wet places (Pte. au Père; Méchins; Mat.).

European: naturalized in temperate eastern N.A.

6. **G. palustre** L. [Hp] Marsh Bedstraw

Wet places (Bic; Mét.; Mtn.; Cha.; God.; Pas.; Mat.); cedar swamp (Car.).

(Boreal-)temperate circumpolar: gap in western N.A.; Mich. to Mingan Is. and Nfld., southw. to N.Y. and Conn.; Faeroes; Eurasia.

7. **G. boreale** L., var. **hyssopifolium** (Hoffm.) DC. [Hpr] (*See* Blake, Rhod. 30: 106-107. 1928.) Northern Bedstraw

River gravels (Drt.; Mat.); woods (Ann.).

Boreal American: Alaska, Yukon, Mack. (Mack. R. Delta, Great Bear L.), to e. Que., southw. to Calif. and N.J.; with the species, boreal circumpolar.

8. **G. labradoricum** Wiegand. [Hp]

Wet places (Bic; Pte. au Père; Mtn.; Drt.; Gpe.; Dou.; Gnd.; Bon.; New Richmond; Car.; Nou.; Esc.). General.

Boreal American: Alb., Sask., w. coast of Hudson Bay, s. Lab., and Nfld., southw. to Wis., Ind., Pa., Conn., and N.Y.

9. **G. trifidum** L. [Hpr]

Wet places (Bic; Yrk.; Bon.; Mar.; Nou.; Zén.); edge of salt marsh (Mtn.); subalpine swamp (Tbl.).

Boreal circumpolar: Alaska, Yukon, Mack. (Mack. R. Delta, Great Bear L.), n. Alb., n. Sask., s. Ont., s. Lab., and Nfld., southw. to Calif., Colo., Ind., Ohio, and n. N. Eng.; Greenland; Iceland; n. Eurasia.

9a. **G. trifidum,** var. **halophilum** Fern. & Wieg., Rhod. 12: 78. 1910.

Halophyte: brackish marshes (Bic; Mtn.; Bon. (type station)).

(Boreal-)temperate eastern American (maritime): e. Que. to Côte Nord and Nfld., southw. to Me.

10. **G. tinctorium** L. [Hp] (*G. Claytoni* Michx.; *G. trifidum* L., subsp. *tinctorium* (L.) Hara, in Rhod. 41: 387-388. 1939.) Wild Madder

Wet places (Bic; Gpe.; Dou.); sea ridges (Bic).

Boreal eastern American: Minn. and s. Ont. to s. Lab. and Nfld., southw. to Ariz. and N.C.

11. **G. Brandegeei** Gray. [Hpr] (*G. brevipes* Fern. & Wieg.; *See* M. P. Porsild, Meddel. om Groenl. 77: 27. 1931.)

Dried marl pond near river mouth (Gnd.) (type station for *G. brevipes*); subalpine meadows (Tbl.; Mtt.).

(Arctic-)boreal American, alpine: Alaska (Seward Pen.), Yukon, Mack. (Mack. R. Delta, Great Bear L.), Hudson Bay (Churchill, n. Que.), Lab., and Nfld., southw. in the mts. to N. Mex. and Gaspe; e. Greenland.

2. Houstonia L.

(Innocence. Bluets)

1. **H. caerulea** L. [Hsr]

Ploughed field (Bic) (a large profusely flowered patch 2 feet wide).

Temperate eastern American: Wis. to e. Que., southw. to Mo., Ala., and Ga.

91. CAPRIFOLIACEAE

(Honeysuckle Family)

a. Corolla tubular or campanulate, sometimes 2-lipped; style slender; flowers variously coloured, not in terminal compound cymes.

b. Plants shrubby, erect.

c. Leaves serrate, taper-pointed; peduncles mostly 3-flowered, the flowers yellow; fruit a long-beaked capsule....................................1. *Diervilla*

c. Leaves entire or with a few coarse teeth; fruit a berry.

d. Corolla irregular, tubular, often gibbous at the base; berry 2-3-celled, several-seeded..2. *Lonicera*

d. Corolla regular, campanulate; berry 4-celled, 2-seeded.......3. *Symphoricarpos*

b. Plants semiherbaceous, trailing; leaves evergreen, round-oval, sparingly crenate; flowers whitish, tinged and striped with rose-purple, hairy inside, in pairs on a long peduncle; fruit dry, 3-celled but 1-seeded..........................4. *Linnaea*

a. Corolla rotate or nearly so, regular; stigmas almost or quite sessile; flowers white, in terminal compound cymes; fruit fleshy.

b. Leaves simple; fruit 1-seeded....................................5. *Viburnum*

b. Leaves pinnate, the leaflets 5-7, ovate-lanceolate, downy beneath; flowers yellowish white; fruit bright red, 3-seeded; bark warty, the pith brown..........6. *Sambucus*

1. Diervilla Mill.

(Bush Honeysuckle)

1. **D. Lonicera** Mill. [N]

Dry woods and rocky places (Bic; Rim.; Mtn.; Trl.; Prr.; Lou.; Ros.; Pcé.; Zén.; Irn.); gravelly river bank (Mat.); subalpine thickets (Mtt.; Pem.). General.

(Boreal-)temperate American: Man. to Côte Nord and Nfld., southw. to Wis. and N. Eng., and in the mts. to Ga.

2. Lonicera L.
(Honeysuckle)

a. Bracts (2 or sometimes 4) at the base of the ovaries small, linear to lance-oblong.
  b. Corolla lobes subequal.
    c. Peduncles 3-7 mm. long; berries blue, edible; leaves oval, thick, strongly reticulate; branches upright.
      d. Corolla villous or pilose; limb of calyx ciliate at least in anthesis; leaves densely villous-subtomentose on both surfaces; branchlets tomentose or densely short-pilose beneath long pilosity........................1. *L. villosa*
      d. Corolla glabrous; limb of calyx glabrous; leaves pilose-hirsute to glabrous beneath, strigose to glabrous above; branchlets with puberulent surfaces or rather sparsely pilose-hirsute.
        e. Young branchlets puberulent and more or less pilose-hirsute; leaves pilose beneath, strigose to glabrate above.................1a. *L. villosa,* var. *Solonis*
        e. Young branchlets merely puberulent; leaves finely pilose to glabrate beneath ....1b. *L. villosa,* var. *calvescens*
    c. Peduncles 14-30 mm. long; berries red; leaves ovate-oblong, often heart-shaped, thin, downy beneath when young, ciliate; branches straggling....2. *L. canadensis*
  b. Corolla strongly 2-lipped, the lips of very unequal breadth, the upper shallowly 4-lobed, the lower of a single entire lobe; berries red or purplish; bracts minute or deciduous; leaves oblong, thick, pale, strongly reticulate..........3. *L. oblongifolia*
a. Bracts 4, broad and foliaceous; corolla viscid-pubescent; berries globose, dark purple; branches 4-angled..4. *L. involucrata*

1. **L. villosa** (Michx.) R. & S. [N] (*L. caerulea* L., var. *villosa* (Michx.) T. & G.; *See* Fernald, Rhod. 27: 1-11. 1925.) Mountain Fly Honeysuckle

Small bog behind barachois (Mar.).

Boreal eastern American: Lake Mistassini to s. Lab. and Nfld., southw. to N.H.; with *L. cauriana* Fernald of western N.A. (Rhod. 27: 10. 1925) boreal American, and these, with *L. caerulea* L., boreal circumpolar.

1a. **L. villosa,** var. **Solonis** (Eaton) Fernald. (*See* Rhod. 27: 5. 1925.)

Cedar swamps (Gnd.; Oie).

(Boreal-) temperate American: Man. to Nfld., southw. to Wis. and R.I.

1b. **L. villosa,** var. **calvescens** (Fern. & Wieg.) Fernald. (*See* Rhod. 27: 5. 1925.)

Wet places (Ann.; Ren.; Gpe.); cedar swamp (Gnd.); brackish swamp (Bnc.); edge of subalpine lake (Lac Ste. Anne, Tbl.); alpine meadows and bogs (Alb.; Tbl.; Log.).

Boreal eastern American, alpine: Ont. to Lab., southw. to Conn.

2. **L. canadensis** Marsh. [N] Fly Honeysuckle

Conifer woods (Bic; Ann.; Gnd.; GCa.; PCa.; Irn.); river gorge (Ren.); river bank (Gnd.); sea cliffs (Bic; Pcé.).

Temperate American: Sask. to Mingan Is. and e. Que., southw. to Minn. and Pa.

3. **L. oblongifolia** (Goldie) Hook. [N.] Swamp Fly Honeysuckle

Wet ground (Bic; Albertville); roadside in woods (Mat.).

Temperate American: Man. to e. Que., southw. to Minn. and Pa.

4. **L. involucrata** (Richards.) Banks. [N] Black Twinberry

River banks (Ann.; Gnd.; Bon.; GCa.; PCa.; Mat.); swamp in spruce woods (Yrk.); subalpine swamp (Lac des Américains, Tbl.); alpine meadows and thickets (Alb.; Tbl.; Mtt.; Log.; Lyl.; Mt. Noble; Lac Ste. Anne, Tbl.).

Disjunct American, alpine: Alaska and central Man. to Calif. and Colo.; Great Lakes region and s. James Bay; Que. (Laurentian Mts. north of Montreal; Gaspe) to N.B.

3. SYMPHORICARPOS Ludwig
(Snowberry)

[Jones: A monograph of the genus Symphoricarpos; Journ. Arnold Arboretum 21: 201-252. 1940.]

a. Young twigs glabrous; leaves usually glabrous, varying to sparsely pilose on the lower surface; larger mature fruits 10-15 mm. thick, in terminal and axillary glomerules; shrubs 1-3 mm. tall....................................1. *S. rivularis*

a. Young twigs finely crisp-puberulent; leaves usually densely short-pilose, prominently reticulate, pale green or glaucous beneath; mature fruits 6-10 mm. thick, in pairs or solitary in the upper axils; shrubs 2-8 dm. tall..........................2. *S. albus*

1. s. RIVULARIS Suksdorf. [N] (*S. racemosus*, var. *laevigatus* Fernald; *S. albus*, var. *laevigatus* Nash; *See* Jones, p. 21.) Garden Snowberry

Conifer woods (Bic); sea ledges (Bic).

European: Alaska to e. Que., southw. to Calif. and Va.; according to Jones, the species occurs in eastern North America only as a cultivated plant and as a garden escape or as a naturalized species along roads.

2. **S. albus** (L.) Blake [N] (*S. racemosus* Michx.)

Bare sea ridges (Bic); subalpine thickets (Log.; Mtt.).

Boreal American: Alaska to e. Que., southw. to Colo. and Va.

4. LINNAEA (Gronov.) L.
(Twin-flower)

1. **L. borealis** L., var. **americana** (Forbes) Rehder. [Ch (active) Evergreen]

Conifer woods (Bic; Mét.; Ann.; Trl.; Drt.; For.; Yrk.; Cha.; Irn.); subalpine woods (Alb.). General in its habitat.

(Arctic-)boreal American: Alaska, Yukon, Mack. (Mack R. Delta, Great Bear L.), middle Hudson Bay (w. and e. coasts), Ungava Bay, n. Lab., and Nfld., southw. to Minn., Ind., Pa., Md., and N.J.; with the species, from which it differs in its more funnel-form exserted corolla (*See* Fernald, Rhod. 24: 210-212. 1922), boreal circumpolar.

5. VIBURNUM L.
(Cranberry-tree. Pimbina)

a. Cymes with marginal flowers much enlarged and neutral, very showy; leaves 3-lobed, the lobes acuminate, coarsely dentate on the sides, entire in the sinuses; petioles bearing 2 glands at the apex..1. *V. trilobum*

a. Cymes with all flowers alike and small.
  b. Leaves palmately veined, with 3 short lobes at the summit, unequally serrate nearly all around; cyme few-flowered; drupe bright red, acid..........2. *V. edule*
  b. Leaves pinnately veined, not lobed, finely crenate-serrate; cyme many-flowered; drupe yellowish and pink when young, finally blue-black, with a bloom, sweet..........3. *V. cassinoides*

1. **V. trilobum** Marsh. [M] (*V. Opulus,* var. *americanum* (Mill.) Ait.; *V. americanum* Mill.; *See* Fernald, Rhod. 43: 481-483. 1941.) Highbush Cranberry.

Thickets and river banks (Bic; Rim.; Ann.; Bnc.; Bon.; Pab.; Mat.).

(Boreal-) temperate American: B.C. to Nfld., southw. to Oreg., S. Dak., and N.Y.; e. Asia.

2. **V. edule** (Michx.) Raf. [N-M] (*V. pauciflorum* La Pylaie; *See* Fernald, Rhod. 43: 481. 1941.) Pimbina. Cranberry Bush

Calcicole: sea cliffs and ledges (Bic; R. Blanche; Lbn.; For.; Gpe.); river ledges (Cap Chat; Ann.; Drt.; Yrk.; Jhn.; Gnd.; Bon.; PCa.; Pab.; Mat.); calcareous alpine meadow (Tbl.); alpine slopes (Alb.; Tbl.; Log.; Pem.; Col.; Bln.).

Boreal American, alpine: Alaska, Yukon, Mack. (Mack. R. Delta, Great Bear L.), n. Man., e. coast of Hudson Bay, Ungava Bay, Lab., and Nfld., southw. to Wash., Colo., the Great Lakes, and N. Eng.

3. **V. cassinoides** L. [M] Withe-rod. Black Haw. Wild Raisin

Swampy soil (Bic; R. Blanche; Mal.; Gnd.; Cha.; New Carlisle; Mar.; Car.).

(Boreal-)temperate American: Man. to Mingan Is. and Nfld., southw. to Ala. and Fla.

6. Sambucus L.
(Elder)

1. **S. pubens** Michx. [M] (*S. racemosa* of Gray's Man., ed. 7.)

Thickets and woods (Bic; Rim.; Prr.; Drt.; Irn.; St. Vianney; Bln.).

Boreal American: Alaska to Nfld., southw. to Calif. and Pa., and Ga.

Forma *calva* Fernald, with leaves glabrous from the first rather than downy beneath (*See* Rhod. 35: 310. 1933), has been collected from thickets in Fernald Pass between Mounts Mattaouisse, Fortin, and Logan, the type station.

92. VALERIANACEAE
(Valerian Family)

1. Valeriana (Tourn.) L.
(Valerian)

a. Segments of middle stem-leaves 9-13, usually sinuate-dentate; corolla 3·5-5 mm. wide, pink or nearly white..........1. *V. uliginosa*
a. Segments of middle stem-leaves 5-7, entire; corolla 3·1 mm. wide or less, white..........2. *V. septentrionalis*

1. **V. uliginosa** (T. & G.) Rydberg. [Grh]

Calcicole: cedar swamp (Bic); calcareous alpine meadow (Tbl.); swampy soil (St. Anaclet; St. Léandre; Mtn.; Bon.; Nou.).

Temperate eastern American: Mich. to e. Que., southw. to N.Y.

2. **V. septentrionalis** Rydberg. [Grh] (*V. sylvatica* Banks.) Rydberg, p. 820.

Calcicole: river gravels (Gnd.; Pab.); calcareous alpine meadow (Tbl.).

Boreal American, alpine: Yukon, Mack. (Great Bear L.), n. Alb., central Sask.; s. Ont., James Bay, and e. coast of Hudson Bay; Gaspe, s. Lab., and Nfld.

93. DIPSACACEAE
(Teasel Family)

1. KNAUTIA L.
(Field Scabious)

1. K. ARVENSIS (L.) Coult. [Hs]

Pastures at foot of Tracadigash Mt. (Car.); hard clay soil (Car.).

European: adventive in temperate eastern N.A.

94. CUCURBITACEAE
(Gourd Family)

1. ECHINOCYSTIS T. & G.

1. **E. lobata** (Michx.) T. & G. [T] Wild Cucumber. Wild Balsam Apple

River bank (Mat.); roadside fence (Bic).

Temperate American: Man. to e. Que., southw. to Tex. and Pa.

95. CAMPANULACEAE
(Bluebell Family)

1. CAMPANULA (Tourn.) L.
(Harebell. Bellflower)

a. Capsules erect, opening by valves near the summit; flowers solitary; corolla 8-12 mm. long; leaves thickish, the cauline linear or linear-oblong, acute, sessile, the basal spatulate, obtuse, narrowed into petioles; dwarf, 3-15 cm. high, alpine..................1. *C. uniflora*

a. Capsules nodding, opening near the base; flowers racemose (sometimes solitary) or clustered in the axils; corolla 14-35 mm. long; plants 1-10 dm. tall.

b. Cauline leaves linear to oblong, the basal (often deciduous by flowering time) orbicular or cordate; native plants of rocks and cliffs.

c. Cauline leaves linear or linear-oblong, sessile; corolla 15-25 mm. long.

d. Stem weak, usually several-flowered; corolla 15-25 mm. long; calyx-lobes subulate, spreading..................2. *C. rotundifolia*

d. Stem dwarf and rigid, 1-few-flowered; corolla usually 25 mm. long; calyx-lobes very slender, soon spreading or deflexed..................2a. *C. rotundifolia*, var. *Langsdorfiana*

c. Cauline leaves oblanceolate or lanceolate to oblong or narrowly obovate, nearly all petioled; corolla 25-35 mm. long............2b. *C. rotundifolia*, var. *alaskana*

b. Cauline leaves ovate or lanceolate; plants pubescent or scabrous, introduced.

c. Flowers nodding, single in the axils of bracts, forming racemes; calyx and capsule scabrous-puberulent; stems smoothish or finely pubescent above..................3. *C. rapunculoides*

c. Flowers in 2's or 3's, rarely solitary, in terminal and axillary loose clusters; calyx bristly, the lobes somewhat foliaceous; stem often bristly above........ ....4. *C. Trachelium*

1. **C. uniflora** L. [Hs] Rydberg, p. 823.

Calcicole: sheltered pockets on abrupt western alpine calcareous slopes (Tbl.) (with *Saxifraga nivalis* var. *tenuis, Carex rupestris, Pyrola grandiflora, Pedicularis flammea,* and *Senecio pauciflorus*) ; dripping chimneys and cliffs (Log.; Mtt.; Pem.).

Arctic circumpolar, alpine: Aleutian Is., Alaska, Mack. (Mack. R. Delta, Great Bear L., Coronation Gulf), Victoria I., Melville I., Ellesmere, Devon, Baffin, Melville, Hudson Bay (Chesterfield Inlet, Southampton I., Hudson Str.), n. Lab., southw. in the mts. to Colo. and Gaspe; w. and e. Greenland; Iceland; Spitsbergen; arctic and alpine Eurasia.

2. **C. rotundifolia** L. [Hsr] Harebell. Bluebell

Sea cliffs (Bic; Mét.; Mtn.; Gro.; Ann.; Trl.; Prr.; Plr.; Cld.; Ros.; For.; Dou.; Pcé.; Bon. I.); river gravels (Jhn.; Bon.; PCa.; Mat.); cliffs above lake (Lac Pleureuse); gravel beach (Pas.); slaty fields (Bic); alpine rocks (Alb.; Tbl.; Mtt.; Bln.).

Arctic circumpolar, alpine: Alaska, Mack. (Great Slave L.), Baffin, Hudson Str., n. Lab., and Nfld., southw. to Nebr. and Pa., and in the mts. to Calif.; Greenland; Iceland; Faeroes; arctic Eurasia.

2a. **C. rotundifolia**, var. **Langsdorfiana** Britton.

Alpine serpentine barrens (Alb.).

Arctic America and arctic Asia.

2b. **C. rotundifolia**, var. **alaskana** Gray. Syn. Fl. N. A. 2, pt. 1: 395. 1886; *See* Fernald, Rhod. 35: 310. 1933.

Calcicole: sea cliffs (Bon. I.).

Disjunct American: n. Aleutian Islands to Sitka; Gaspe, Nfld., and N.S.

3. C. RAPUNCULOIDES L. [Hs] False Rampion. Bellflower

Fields (New Richmond); near houses (Mar.); dry sand (Gpe.); habitat not stated (Bic; Yrk.; Dou.).

Eurasian: naturalized in temperate eastern N.A.

4. C. TRACHELIUM L. [Hp] Nettle-leaved Bellflower. Throatwort

Roadside near houses (Bic).

Eurasian: naturalized in Quebec.

96. LOBELIACEAE
(Lobelia Family)

1. LOBELIA L.
(Lobelia)

[McVaugh: Studies in the taxonomy and distribution of the Eastern North American species of Lobelia; Rhod. 38: 241-263, 276-298, 305-329, 346-362. 1936.]

a. Plants aquatic; leaves fleshy, linear, hollow, forming a basal rosette; scape nearly naked, few-flowered; anthers all densely tufted at top; capsules long-stalked, pendant ....1. *L. Dortmanna*

a. Plants terrestrial, leafy-stemmed; leaves flat.

  b. Base of lower lip of corolla smooth; pedicels filiform, as long as the flowers, minutely 2-bracteolate or 2-glandular above the middle; leaves linear to linear-oblong, entire or denticulate; stems slender, glabrous..................2. *L. Kalmii*

  b. Base of lower lip of corolla densely hairy; pedicels shorter; leaves broader; stems hairy.

    c. Capsules much inflated; leaves repand-dentate or denticulate; stems becoming much-branched, densely long-pubescent............................3. *L. inflata*

    c. Capsules not inflated; leaves mostly entire, thickish, pale green; stems slender, unbranched; plant bristly-pubescent throughout........4. *L. spicata*, var. *hirtella*

1. **L. Dortmanna** L. [HH] Water Lobelia

Shallow water of ponds (Lac des Pins, Rimouski co.; Lac Pérot, Matane co.; Lac des Sept-Iles, Cha.).

Boreal circumpolar: B.C., N.W.T., Lab., and Nfld., southw. to Oreg. and N.J.; Faeroes; nw. Europe.

2. **L. Kalmii** L. [Hs] Brook Lobelia

Calcicole: sea cliffs (God.); river gravels and ledges (Rim.; Lou.; Val.; Drt.; Jhn.; Gnd.; God.; Bon.; Nou.; Mat.); bog (Bic).

Boreal American: B.C., Mack. (Great Slave L.), to Hudson Bay and Nfld., southw. to Iowa, Ohio, and Mo.

3. **L. inflata** L. [T] Indian Tobacco

Habitat not stated (Rim.).

Boreal American: Sask. to Lab., southw. to La., Kans., and Ga.

4. **L. spicata** Lam., var. **hirtella** Gray. [Hs] Pale Spiked Lobelia

River mouth (Gnd.).

Temperate American: Alb. to e. Que., southw. to Kans., Ind., and N.Y.

97. COMPOSITAE
(Composite Family)

a. Flowers of the head all ligulate; juice usually milky (LIGULIFLORAE).

  b. Pappus of scales; flowers bright blue, showy..........................1. *Cichorium*

  b. Pappus of plumose bristles; flowers yellow.

    c. Leaves cauline, linear, grass-like................................2. *Tragopogon*

    c. Leaves all basal, pinnatifid.

      d. Receptacle chaffy; achenes rough, with very slender beaks longer than the body, 10-ribbed...3. *Hypochaeris*

      d. Receptacle not chaffy; achenes finely striate, the inner ones not beaked...4. *Leontoden*

  b. Pappus-bristles simple, at most scabrous.

    c. Achenes spiny or strongly papillose near the summit, beaked; heads solitary on a slender hollow scape...5. *Taraxacum*

    c. Achenes not spiny, beaked or beakless; stems leafy (except certain species of *Hieracium*).

      d. Achenes flat or flattish.

        e. Body of achene truncate at summit; heads large, 12-40 mm. in diameter, subcorymbose; flowers 50 or more in each head, yellow..........6. *Sonchus*

        e. Body of achene beaked or with a narrow neck; heads small, 4-10 mm. in diameter, paniculate, 6-30-flowered.............................7. *Lactuca*

d. Achenes columnar, often slender.
e. Flowers purplish or whitish, the heads nodding................8. *Prenanthes*

e. Flowers bright yellow to deep orange-red.

f. Pappus white.

g. Achenes beaked; involucre loosely imbricated; leaves linear-lanceolate, flaccid, entire or remotely incised-pinnate, glabrous, ciliate at base...9. *Agoseris*

g. Achenes beakless; involucral bracts in a single row; leaves narrow, runcinate, often sagittate-auriculate; heads small, in a loose panicle...10. *Crepis*

f. Pappus tawny, the bristles fragile; leaves entire or toothed; plants hispid or hirsute...................................11. *Hieracium*

a. Flowers of the head tubular, or only the marginal ones ligulate; juice not milky (TUBULIFLORAE).

b. Stamens distinct or almost so; heads unisexual, rayless, the staminate and the pistillate heads very different in appearance; pappus none; involucre of the pistillate flowers closed and woody.

c. Pistillate heads forming an oblong or oval bur terminated by 2 horns and covered with hooked spines; leaves broadly ovate, cordate, simply or doubly dentate, more or less lobed.....................................12. *Xanthium*

c. Pistillate heads obovoid, small, with a few acute tubercles at the summit but not spiny...13. *Ambrosia*

b. Stamens with anthers united into a tube encircling the style.

c. Heads without ray flowers.......................................GROUP A.

c. Heads with both ray and disk flowers..............................GROUP B.

GROUP A

a. Pappus composed of awns, these often barbed; flowers yellow; plants of wet places...14. *Bidens*

a. Pappus composed of scales; flowers purple or white; involucral bracts hooked, forming a bur...15. *Arctium*

a. Pappus none or a mere crown.

b. Flowers blue or purplish...16. *Centaurea*

b. Flowers yellow or whitish; strong-scented herbs.

c. Heads corymbose, erect..17. *Tanacetum*

c. Heads solitary on slender terminal peduncles; leaves linear-oblong, irregular, 3-many-toothed; stems decumbent and somewhat creeping............18. *Cotula*

c. Heads racemose or paniculate, nodding, small......................19. *Artemisia*

a. Pappus of capillary bristles.

b. Involucral bracts scarious throughout; plants more or less white-woolly.

c. Basal leaves much larger than the cauline and differing from them in shape...20. *Antennaria*

c. Basal leaves absent at anthesis or, if present, similar to the cauline ones.

d. Involucre papery-white, the bracts finely striate, spreading.......21. *Anaphalis*

d. Involucre yellowish or brownish, the bracts subappressed, not striate...22. *Gnaphalium*

b. Involucral bracts not wholly scarious; plants not woolly (except somewhat so in the axils of certain species of *Senecio*).

c. Involucral bracts uniseriate, often with minute bracts at base.

d. Leaves all basal, reniform to deltoid; scape with phyllodia; flowers nearly white...23. *Petasites*

d. Cauline leaves present; flowers yellow...............................24. *Senecio*

c. Involucral bracts in 2-many series.

d. Foliage spiny; receptacle densely bristly; pappus plumose.........25. *Cirsium*

d. Foliage not spiny.

e. Receptacle bristly; involucral bracts dentate or fimbriate; flowers blue or purplish...16. *Centaurea*

e. Receptacle naked; involucral bracts entire; flowers white or pale purple...26. *Eupatorium*

GROUP B

a. Pappus composed of awns, these often barbed; flowers yellow; receptacle chaffy; plants of wet places..14. *Bidens*

a. Pappus composed of scales, which are sometimes deciduous; receptacle chaffy.
b. Rays white; flower-heads very small, with 4-5 rays; plants low and weak..27. *Galinsoga*
b. Rays yellow, numerous; heads large...............................28. *Helianthus*

a. Pappus none or a mere crown.
b. Receptacle naked.
c. Rays yellow; strong-scented herbs...............................17. *Tanacetum*
c. Rays white or wanting.
d. Receptacle flat to hemispheric; bracts of the involucre in several series..29. *Chrysanthemum*
d. Receptacle conic to ovoid; bracts in few series..................30. *Matricaria*
b. Receptacle chaffy.
c. Rays white; leaves pinnately dissected.
d. Heads 3-7 mm. broad, corymbose; achenes flattened............31. *Achillea*
d. Heads 13-30 mm. broad, solitary, terminal; achenes terete........32. *Anthemis*
c. Rays yellow; chaff of the dull brown disk hairy at the tip; leaves nearly entire; plants very rough and bristly-hairy throughout..................33. *Rudbeckia*

a. Pappus capillary; receptacle not chaffy.
b. Rays yellow.
c. Leaves all basal, round-heart-shaped, angled or toothed, white-tomentose beneath; heads solitary, on a scapose scaly-bracted stem, appearing before the leaves..34. *Tussilago*
c. Cauline leaves present; plants flowering in summer or autumn.
d. Leaves opposite; heads large....................................35. *Arnica*
d. Leaves alternate.
e. Heads few, 1-20.
f. Heads 3-10 cm. broad (*Senecio Pseudo-Arnica* may be sought here); leaves broadly oblong, rough above, densely pubescent beneath, the cauline ones partly clasping...36. *Inula*
f. Heads 1-2 cm. broad...24. *Senecio*
e. Heads generally very numerous, small..........................37. *Solidago*
b. Rays violet, purple, blue, or white.
c. Involucral bracts in 1-2 series.
d. Leaves large, reniform to deltoid, basal..........................23. *Petasites*
d. Leaves smaller, linear to obovate, cauline and basal; rays narrow, very numerous.
e. Central hermaphrodite flowers few; pistillate flowers numerous, with filiform corollas, the inconspicuous white ligules shorter than the tubes and scarcely if at all exceeding the pappus; heads small, 2-4 mm. in diameter, cylindrical, panicled; leaves linear, mostly entire, the basal cut-lobed; stem erect, wand-like...38. *Conyza*
e. Central hermaphrodite flowers and pistillate flowers many; heads larger, few or solitary; stems not wand-like..............................39. *Erigeron*
c. Involucral bracts in 3-5 imbricated series; heads many-flowered, on leafy peduncles...40. *Aster*

1. CICHORIUM (Tourn.) L.

1. C. INTYBUS L. [Hs] Chicory. Blue Sailors

Fields and roadsides (Bic; Rim.); roadside cliffs (Mat.); fields (Anse au Griffon); river gravels (Ann.).

European: naturalized throughout temperate N.A.

2. TRAGOPOGON (Tourn.) L.

1. T. PRATENSIS L. [Hs] Goat's Beard
Fields and roadsides (Bic).
European: naturalized throughout temperate N.A.

3. HYPOCHAERIS L.

1. H. RADICATA L. [Hr] Cat's-ear
River estuary (Bon.); fields (Mrn.).
European: adventive throughout temperate N.A.

4. LEONTODON L.

1. L. AUTUMNALIS L. [Hr] Fall Dandelion. Hawkbit
Sea cliffs (Lou.; Lbn.); river gravels (Bon.); sea beach (Mad.; Cha.; Newport); roadside (Val d'Espoir); fields (Gpe.; Yrk.; Pcé.; Pas.).
European: naturalized in temperate eastern N.A.

5. TARAXACUM Ludwig
(Dandelion)

[Fernald: Taraxacum in Eastern America; Rhod. 35: 369-386. 1933.]

a. Mature achenes mostly tuberculate nearly or quite to the base, the tubercles, at least of the upper half, closely crowded, the surface of the achene without broad and plane intermediate areas; beak of the achene 6-17 mm. long; involucre green, purplish, or livid, 1·2-3 cm. high, with 10-25 inner bracts.

  b. Many of the involucral bracts with a conspicuous corniculate appendage or knob below the tip; outer calyculate bracts appressed to and much shorter than the inner, firm, often with a conspicuous, white, scarious border; inner bracts 1·2-2 cm. long; beak of fruit 6-14 mm. long................................1. *T. ceratophorum*

  b. Most or all of the involucral bracts with plane and unappendaged tips; outer bracts thin and herbaceous, when strongly recurving scarcely or only slightly broader than the inner.

    c. All or nearly all the leaves with broad bases, their margins shallowly dentate to sinuate-lobed, the teeth and lobes mostly entire; inner involucre 1·3-2 cm. high, during anthesis with bracts separated to within 1 or 2 mm. of the base, their herbaceous central part 1-3 mm. long (excluding the pyramid); beak 6-9 mm. long.

      d. Outer bracts reflexed, linear-lanceolate, 0·8-1·3 cm. long, 1·5-3 mm. wide...2. *T. ambigens*

      d. Outer bracts erect, ovate to ovate-lanceolate, 5-8 mm. long, 2·5-4 mm. wide..2a. *T. ambigens*, var. *fultior*

    c. All or nearly all of the leaves tapering below to slender petioles, their margins with mostly sharply toothed deltoid lobes or teeth; inner involucres 1·5-2·7 cm. high, during anthesis with the bracts united at base for 3-6 mm., their herbaceous central part 1·6-4 mm. wide, with white scarious margin 1·3-1·5 mm. broad at base; achenes olivaceous, grey or fuscous, cuneate, 2·8-3·8 mm. long (excluding the pyramid); beak 9-12 mm. long..............................3. *T. latilobum*

a. Mature achenes tuberculate only above the middle or, if occasionally toward the base, the tubercles remote and with broad plane intermediate areas or bands.

  b. All or at least many of the involucral bracts corniculate-appendaged.

    c. Achenes greyish, drab, pale brown, or olivaceous; pappus bright white; upper faces of ligules orange-yellow; outer calyculate bracts spreading, recurving at maturity; pyramid slender, 3-4 times as long as broad; beak 10-13 mm. long; leaves deeply sinuate, with the linear-caudate lobes lacerate at the deltoid base and with shorter intermediate narrow lobes..........................4. *T. Longii*

c. Achenes red or reddish purple; pappus creamy or sordid; upper face of ligules sulphur-yellow; leaves mostly dissected nearly or quite to the midrib..5. *T. laevigatum*

b. All or nearly all of the involucral bracts unappendaged; achenes subtruncate or strongly rounded below the short (0·3-1 mm. long) pyramid.

c. Leaves usually narrowed below to a slender, scarcely winged, petiolar base, at least the lower and longer marginal lobes toothed and with frequent intermediate small teeth; achenes (excluding the slender pyramid) 2-4 mm. long, drab or olivaceous...6. *T. officinale*

c. Leaves mostly broad at base or with broadly winged petiole; marginal lobes entire or with few teeth; intermediate teeth few or none; achenes (excluding pyramid) 3·5-5 mm. long, olivaceous to fulvous................7. *T. lapponicum*

1. **T. ceratophorum** (Ledeb.) DC. [Hr]

Calcicole: sea cliffs and talus (Bic; Gro.; Srl.; Marsouins; Mrn.; Pcé.); river gravels (Cap Chat; Ann.; Gnd.; Bon.; PCa.; GCa.).

Arctic circumpolar, alpine: Mack., Banks I., Melville I., King William I., n. Que., s. Baffin, Lab., and Nfld., southw. to B.C. and Gaspe, and in the mts. to Calif. and N.H.; arctic and alpine Eurasia.

2. **T. ambigens** Fernald, Rhod. 35: 376. 1933. [Hr]

Calcicole: river gravels and damp ledges (Ann.; Gnd.; GCa.); moist sea cliffs (Prr.).

Gulf endemic: Gaspe to s. Lab. and w. Nfld.

2a. **T. ambigens**, var. **fultior** Fernald, Rhod. 35: 376. 1933.

Mossy alpine meadows (Mtt.; Log.; Ftn.).

Gulf endemic, alpine: e. Que. and Nfld.

3. **T. latilobum** DC. [Hr]

Calcicole: sea cliffs and talus (Gro.; Trl.).

(Boreal-)temperate eastern American: e. Que. to Nfld., southw. to N. Eng.

4. **T. Longii** Fernald, Rhod. 35: 379. 1933. [Hr]

Calcicole: river gravels (Gnd.) (type station).

Gulf endemic: e. Que. and Nfld.

5. T. LAEVIGATUM (Willd.) DC. [Hr] (*T. erythrospermum* Andrz.) Red-seeded Dandelion

Dry sands (Bic).

European: naturalized in temperate eastern N.A.

6. T. OFFICINALE Weber. [Hr] (*T. palustre*, var. *vulgare* (Lam.) Fernald; *T. vulgare* (Lam.) Schrank)

Slaty sea cliffs (Bic; Lou.; Mad.; Clr.); river gravels (Gnd.; GCa.; Mat.; Res.); fields and roadsides (Bic; Drt.; Yrk.; Dan.; Car.; Nou.). General.

Eurasian: naturalized throughout temperate N.A.

7. **T. lapponicum** Kihlman. [Hr]

Calcicole: river gravels and ledges (Gnd.; Bon.; PCa.); slopes and summits of sea cliffs (Prr.); calcareous alpine meadow (Tbl.); alpine meadows (Mtt.; Ftn.); alpine slopes (Alb.).

Arctic circumpolar, alpine: s. Mack., n. Sask., middle Hudson Bay (e. coast), Baffin, Akpatok I., n. Lab., and Nfld., southw. to James Bay and Gaspe, and the mts. of B.C.; w. and s. Greenland; arctic Eurasia.

6. SONCHUS (Tourn.) L.

(Sow Thistle)

a. Heads large, about 4 cm. broad, deep yellow; achenes 2-3 mm. long, cross-wrinkled on the ribs; leaves runcinate-pinnatifid, spiny-toothed, the clasping auricles acute; perennials with creeping rootstocks.
  b. Involucre and peduncles glandular-setose............................1. *S. arvensis*
  b. Involucre and peduncles glabrous..................1a. *S. arvensis*, var. *glabrescens*

a. Heads smaller, 1·2-2·5 cm. broad, pale yellow; involucre glabrous; achenes 1-1·5 mm. long; annuals with fibrous roots.
  b. Stem-leaves spiny-toothed, scarcely divided, the auricles at the base rounded; achenes longitudinally ribbed, not cross-wrinkled.........................2. *S. asper*
  b. Stem-leaves runcinate-pinnatifid, soft-spiny or unarmed, the auricles at the base acute; achenes ribbed, cross-wrinkled..............................3. *S. oleraceus*

1. S. ARVENSIS L. [Hsr] Field Sow Thistle

Bare rocks (Bic); sea beach (Bic; Pcé.); fields (Bic; Rim.; Mét.; Drt.). General.

European: naturalized throughout temperate N.A.

1a. S. ARVENSIS, var. GLABRESCENS Guenther, Grab. & Wimm. (var. *laevipes* Koch).

Sea beach (Bic).

European: widely introduced.

2. S. ASPER (L.) All. [T] Spiny Sow Thistle

Banks of river estuary (Rim.).

European: naturalized throughout temperate N.A.

3. S. OLERACEUS L. [T] Common Sow Thistle

Fields (Dou.; Pcé.; Gnd. (f. *integrifolius* (Wallr.) Beck)); ballast-filling about fish-houses (Yrk.) (including the above form and f. *lacerus* (Willd.) Beck).

European: naturalized throughout temperate N.A.

7. LACTUCA L.

(Wild Lettuce)

a. Flowers pale blue; achenes narrowed above, but not slender-beaked, 3-nerved on each face; pappus tawny; heads in a large and dense compound panicle; leaves irregularly pinnatifid, sometimes runcinate; plant 1-3·5 m. high, nearly smooth..1. *L. biennis*

a. Flowers yellowish; achenes distinctly slender-beaked, 1-nerved on each face; pappus white.
  b. Involucre 16-22 mm. long; achenes 7-9 mm. long; pappus hairs 9-12 mm. long; flowers yellow-purple; leaves sparingly and coarsely setose along the midrib, the lateral divisions broadest above the base, often obliquely truncate at apex..2. *L. hirsuta*, var. *sanguinea*

b. Involucre 10-14 mm. long; achenes 3-3·5 mm. long; pappus hairs 5-7 mm. long; flowers pale yellow; leaves glabrous or nearly so, pale beneath.
  c. Leaves unlobed (or the lowest sometimes shallowly lobed), entire or denticulate .... 3. *L. canadensis*
  c. Leaves with linear-falcate, usually entire, lobes; upper unlobed leaves (if any) linear or linear-lanceolate .... 3a. *L. canadensis*, var. *longifolia*

1. **L. biennis** (Moench) Fernald. [Hs] (*L. spicata* of Gray's Man., ed. 7; *See* Fernald, Rhod. 42: 300-302. 1940.) Blue Lettuce

Fields and waste places (Bic; Rim.; Anse à la Loutre; Drt.; Yrk.; Im.); beach (Car.).
Boreal American: Man. to s. Lab. and Nfld., southw. to Colo., Tenn., and N.C.

2. **L. hirsuta** Muhl., var. **sanguinea** (Bigel.) Fern. [Hs] *See* Fernald, Rhod. 40: 477-482. 1938.

Hillside pasture (Bic).
Temperate eastern American: Que. to Tex. and Ala.

3. **L. canadensis** L. [Hs] (*L. integrifolia* Bigel.; *L. canadensis*, var. *integrifolia* (Bigel.) Gray; *See* Wiegand, Rhod. 22: 9-11. 1920; Fernald, Rhod. 40: 480-481 (footnote). 1938.) Wild Lettuce

Dry field (Car.).
Temperate eastern American: Wis. to e. Que., southw. to Okla. and Ga.

3a. **L. canadensis,** var. **longifolia** (Michx.) Farwell. (*L. canadensis* of Gray's Man., ed. 7; *See* Fernald, Rhod. 40: 481. 1938.)

Borders of fields or thickets (Bic; Ann.; Pcé.; Bon.; Car.; Res.).
Temperate American: B.C. to e. Que., southw. to Colo., Ark., La., Ala., and Ga.

8. PRENANTHES (Vaill.) L.

a. Inflorescence hirsute-pubescent, strict, the heads erect; flowers purplish; leaves oval or oblong-lanceolate, denticulate, smooth, and glaucous .... 1. *P. racemosa*

a. Plants glabrous; heads racemose or paniculate, commonly pendulous, the flowers greenish or yellowish white; leaves, or some of them, lobed or divided.
  b. Involucre very slender, of 5 primary greenish bracts; heads 5-7-flowered, very numerous in a narrow leafy panicle; pappus cream-colour.
    c. Plant glabrous .... 2. *P. altissima*
    c. Stems villous or hispid; leaves at least hispidulous on the veins beneath .... 2a. *P. altissima*, var. *hispidula*
  b. Involucre thick-cylindric, of 6-8 primary bracts; heads 8-12-flowered; pappus light brown.
    c. Inflorescence an elongate panicle, the heads clustered at the tips of the branches or in the upper axils; bracts glaucous, the primary ones pale green or purple-tinged, linear-lanceolate, the outer ones lance-deltoid, the longest 1·5-2·5 mm. long .... 3. *P. trifoliolata*
    c. Inflorescence a thyrse or raceme, rarely somewhat paniculate; bracts glabrous, lead-colour or blackish, the primary ones linear- to lance-oblong, the outer ones ovate to ovate-lanceolate, very unequal, the longest 3-6 mm. long .... 3a. *P. trifoliolata*, var. *nana*

1. **P. racemosa** Michx. [Hs]

Calcicole: sea cliffs (Bon. I.); river ledges and gravels (Bon.; Gnd.; Nou.; Mat.).

Temperate American: Alb., Sask., Man., Great Lakes, James Bay, and Côte Nord, southw. to Colo., Mo., and N.J.

2. **P. altissima** L. [Hsr] Rattlesnake Root

Conifer woods (Bic; Mét.; Mtn.; Srl.; Plr.; Val.; Gpe.; Yrk.; Mat.); river ledges and gravels (Mat.; Res.); subalpine woods (Lac Ste. Anne). General in its habitat.

(Boreal-)temperate eastern American: Man. to Nfld., southw. to Tenn. and Ga.

2a. **P. altissima,** var. **hispidula** Fernald.

Conifer woods (Bic; Plr.; Yrk.).

Temperate eastern American: e. Que. to Vt. and Conn.

3. **P. trifoliolata** (Cass.) Fernald. [Hsr] Gall-of-the-Earth

Sea cliffs and ridges (Bic; Rim.; Prr.; Pcé.); river ledges (Ann.); woods (Val.); alpine slopes (Tbl.; Bln.).

(Boreal-)temperate eastern American, alpine: Que. to Nfld., southw. to Tenn. and N.C.

Forma *ciliata* Victorin & Rousseau, with coriaceous leaves, the margins with red hairs up to 1 mm. long, pubescent beneath (Contrib. Inst. Bot. Univ. Montréal, No. 36: 54. 1940), has been collected from the talus of sea cliffs of Mont St. Pierre, the type station.

3a. **P. trifoliolata,** var. **nana** Fernald. (*P. nana* (Bigel.) Torr.)

Alpine meadows and mossy slopes (Tbl.; Log.; Ftn.; Pem.); alpine serpentine barrens (Alb.); gravel outwash plain below Mt. Albert (R. du Diable).

Boreal eastern American, alpine: Gaspe Peninsula to Lab. and Nfld., southw. to N.H.

9. AGOSERIS Raf.
(Goat Chicory)

1. **A. aurantiaca** (Hook.) Greene. [Hr] (*A. gaspensis* Fernald, Rhod. 26: 125. 1924; *A. gracilens* (Gray) Kuntze.)

Alpine meadows and brooksides (Tbl.).

Disjunct American, alpine: B.C. and Alb. to Calif., n. N. Mex., and probably n. Ariz.; Gaspe Peninsula. Because the range of variation of the cordilleran population (as distinguished from the type material) encompasses that of the plants from Quebec, Cronquist has merged these with the western species (*See* Rhod. 50: 32. 1948).

10. CREPIS L.
(Hawk's Beard)

1. C. TECTORUM L. [T]

Waste places (Fla.).

European: adventive in temperate eastern N.A.

11. HIERACIUM (Tourn.) L.
(Hawkweed)

a. Leaves all basal, or 1-2 also on the stem near its base.
  b. Plants glabrous and glaucous, or only a little hispid; heads 15-25 mm. in diameter; elongated stolons absent; rootstocks short and stout..............1. *H. florentinum*
  b. Plants strongly pubescent; elongated stolons present; rootstocks slender, creeping.
    c. Flowers orange-red..2. *H. aurantiacum*
    c. Flowers yellow.
      d. Leaves tomentose beneath; scapes bearing 1-3(-4) heads; scapes 1-4 dm. long ....3. *H. Pilosella*
      d. Leaves not tomentose beneath; scapes bearing several or many heads in rather dense clusters, 3-10 dm. long..................................4. *H. pratense*
a. Leaves mostly cauline.
  b. Cauline leaves 2-6(-10); basal leaves tapering to a slender petiole.
    c. Involucre and pedicels stipitate-glandular, with no or only few glandless villi overtopping the glands; inflorescence paniculate-corymbose, with arched- or divergent-ascending branches and pedicels; heads few-30 or more..5. *H. vulgatum*
    c. Involucre and pedicels glandless or only very minutely glandular, copiously long-pilose or villous with glandless hairs; inflorescence strict, with 1-10(-20) heads on erect peduncles or branches..................................6. *H. Robinsonii*
  b. Cauline leaves numerous.
    c. Heads 2·5-4·5 cm. in diam.; leaves coarsely toothed, acute.
      d. Involucre 8-13 mm. high; upper internodes of stem and branches without or with only a few scattered setæ..............................7. *H. canadense*
      d. Involucre 5-10 mm. high; middle and upper internodes of stem and the peduncles copiously villous-hirsute.........7a. *H. canadense*, var. *hirtirameum*
    c. Heads 1-2·3 cm. in diam.; leaves subentire, denticulate, hairy on both surfaces, obtuse; plant rough-hairy.....................................8. *H. scabrum*

1. H. FLORENTINUM All. [Hr] King Devil

Sea cliffs and talus (Bic; Lou.; Gpe.); river gravels (Gnd.; Bon.; PCa.); fields (Car.).

European: naturalized in temperate eastern N.A.

2. H. AURANTIACUM L. [Hrr] Orange Hawkweed. Devil's Paintbrush

Fields (Bic; Irn.); slaty ridges (Bic).

European: naturalized throughout temperate N.A.

3. H. PILOSELLA L. [Hrr] Mouse-ear

Dry slaty fields (Bic); slaty ridges (Bic).

European: naturalized in temperate eastern N.A.

4. H. PRATENSE Tausch. [Hrr] King Devil

Fields (Bic; Irn.; Lou.); railway ballast (Mat.; Amqui); meadow by river (Prr.; Drt.); river gravels (Bon.); roads and trails (GCa.); valley (Bln.); alpine schists (Log.).

European: naturalized in temperate eastern N.A.

5. H. VULGATUM Fries. [Hs] Common Hawkweed

Slaty sea ridges (Bic); sea cliffs (Pcé.; Bon. I.); rocky banks (Mad.); woods (Rim.); river ledges (Mat.).

European: naturalized in temperate eastern N.A.

6. **H. Robinsonii** (Zahn) Fernald. [Hs] (*H. smolandicum* Almq., subsp. *Robinsonii* Zahn; *See* Fernald, Rhod. 45: 317. 1943.)

Calcicole: river ledges (Ann.).

(Boreal-)temperate eastern American: e. Que. to Nfld., southw. to Me. and N.H.

7. **H. canadense** Michx. [Hp] Canada Hawkweed

Gravel beaches (Bic; Ren.); calcareous ledges and cliffs (Mtn.; Ann.; Pcé.; Bon.; PCa.; Dou.).

(Boreal-)temperate American: B.C. and sw. Mack. to Lab., southw. to Oreg., S. Dak., Ind., Pa., and N.J.

7a. **H. canadense,** var. **hirtirameum** Fernald, Rhod. 17: 19. 1915. (*See also* Fernald in Rhod. 45: 321-322. 1943.)

Gravel beach (Bic); river ledges and gravels (Ann.; Drt.; Bon.; PCa.; GCa.; Mat.); dry talus (Lac Pleureuse); slaty field (Bic); alpine schists (Pem.).

(Boreal-)temperate eastern American: Wis. to Nfld., southw. to Pa. and N. Eng.

8. **H. scabrum** Michx. [Hp]

Dry woods, clearings, and waste places (Trl.; Pén.; Gpe.; Dou. (collection originally referred to var. *tonsum* Fernald & St. John, Rhod. 16: 182. 1914); Drt.; Dan.; Bon.; PCa.; Car.; Nou.).

Temperate eastern American: Minn. to e. Que., southw. to Kans., Nebr., Iowa, and Ga.

12. Xanthium (Tourn.) L.
(Cocklebur)

1. **X. pungens** Wallr. [T] (*X. canadense* Mill.)

Wet river gravels (Rim.).

Temperate American: widely distributed.

13. Ambrosia L.
(Ragweed)

a. Leaves opposite, palmately 3-5-lobed or undivided; receptacle naked; fruit 5-6-ribbed and tubercled; stem stout, 1-6 m. high..............................1. *A. trifida*

a. Leaves opposite and alternate, 1-2-pinnatifid; receptacle chaffy.
  b. Leaves 2-pinnatifid, thin; fruit with about 6 short tubercles near the summit...2. *A. artemisiifolia*
  b. Leaves 1-pinnatifid, thick; fruit almost without tubercles........3. *A. coronopifolia*

1. A. TRIFIDA L. [T] Great Ragweed

Fields (Rim.; Lou.; Cap d'Espoir; Gnd.; Cha.; New Richmond; Mar.).

Western American: Man. to e. Que., southw. to N. Mex. and Fla.; introduced in the East.

2. A. ARTEMISIIFOLIA L. [T] Common Ragweed

Fields and roadsides (Rim.; Gnd.; Cha.; Dan.; PCa.; Pas.).

Western American: B.C. to e. Que., southw. to Mex. and Fla.; introduced in the East and in Europe.

3. A. CORONOPIFOLIA T. & G. [Hpr] (*A. psilostachya* of Gray's Man., ed. 7.) Western Ragweed

Dry pasture (Ann.).
Western American: introduced in the East.

14. BIDENS L.
(Bur Marigold. Beggar Ticks)

[Fassett: A key to the northeastern American species of Bidens; Rhod. 27: 184-185. 1925. Sherff: The genus Bidens; Field Mus. Nat. Hist. Publ. Bot. Ser. 16: 1-709. 1937.]

a. Achenes not striate, 7-10 mm. long, black; outer involucre of 5-8 ciliate bracts; rays small, yellow; leaves pinnate with 3-5 sharply serrate divisions.........1. *B. frondosa*

a. Achenes striate; leaves simple, often deeply cleft.
  b. Summit of achenes not convex and cartilaginous; achenes dark brown to black; outer involucral bracts regularly and copiously ciliate...............2. *B. tripartita*
  b. Summit of achenes convex and cartilaginous.
    c. Heads hemispherical, nodding in anthesis; outer involucral bracts reflexed, spreading or subascending; achenes rhomboidal in cross-section, finely and obscurely striate, often tuberculate, curved, strongly keeled, with pale corky margins; anthers exserted, purple-black...........................3. *B. cernua*
    c. Heads campanulate to subhemispherical, erect in anthesis; outer involucral bracts ascending; achenes biconvex, coarsely and deeply striate, not tuberculate; anthers included, pale.
      d. Leaves thin, with (1-)2-3 pairs of teeth; outer involucral bracts with 1, rarely 2, pairs of teeth; inner bracts broadly oblong, 3-4 mm. wide..4. *B. hyperborea*, var. *Svensoni*
      d. Leaves fleshy, with 0-2 pairs of teeth; outer involucral bracts entire or rarely with 1 pair of teeth; inner bracts narrowly oblong, 2-3 mm. wide...4a. *B. hyperborea*, var. *gaspensis*

1. **B. frondosa** L. [T]

Gravel beach (Bic); wet places (Nou.).
(Boreal-)temperate American: B.C. to Nfld., southw. to Colo., Tex., and Fla.

2. B. TRIPARTITA L. [T]

Damp hollows of cedar swamp (Pcé.).
European: adventive in temperate eastern N.A.

3. **B. cernua** L. [T] (*See* Fernald, Rhod. 24: 206-207. 1922.) Nodding Bur Marigold

Wet places (Bic; Pte. au Père; Bon.).
Temperate circumpolar: B.C., n. Alb., Hudson Bay, e. Que., and the Magdalen Islands, southw. to Calif., Mo., and N.C.; Eurasia.

4. **B. hyperborea** Greene, var. **Svensoni** Fassett, Rhod. 27: 170. 1925. [T]

Halophyte: tidal shores at river mouth (Rim.) (type station).
Local endemic (maritime).

4a. **B. hyperborea,** var. **gaspensis** Fernald, Rhod. 20: 150. 1918.

Halophyte: brackish shores at river mouths (Mtn.; Drt. (type station); Yrk.; Jhn.; R. Ouest; Bon. (distributed as var. *laurentiana* Fassett, but placed by Sherff in var. *gaspensis*); PCa.; Res.).

Gaspe endemic (maritime): the whole species is confined to river estuaries from James Bay (var. *typica*) to Mass. (vars. *colpophila* and *arcuans*); *See* discussion in Cain, Foundations of Plant Geography, pp. 386-387. 1944; Fassett, Rhod. 48: 82-83. 1946.

15. ARCTIUM L.
(Burdock)

a. Involucre smooth or slightly cobwebby; petioles slightly angular.........1. *A. minus*

a. Involucre large and conspicuously woolly; petioles very angular....2. *A. tomentosum*

1. A. MINUS Bernh. [Hs] Common Burdock
Fields and roadsides (Bic; Rim.; Prr.; Lou.).
European: naturalized throughout temperate N.A.

2. A. TOMENTOSUM Mill. [Hs] Woolly Burdock
Fields (St. Anaclet, Rimouski co.); talus slope (Prr.).
European: sparingly introduced into eastern Canada and the United States.

16. CENTAUREA L.

a. Annuals with floccose white pubescence and simple entire linear or lanceolate leaves; involucral bracts lanceolate, without dilated tips, the outer ones bordered by a white or silvery, sharp-toothed, scarious band; flowers usually blue, the marginal ones especially large and showy; pappus nearly as long as the achenes........1. *C. Cyanus*

a. Perennials; lower leaves sinuate-dentate or pinnatifid; involucral bracts with pectinate-ciliate margins.

  b. Lower leaves sinuate-dentate, the upper much reduced, entire; involucral bracts with abruptly much-dilated, blackish, deeply pectinate-ciliate tips mostly hiding the pale bodies; flowers rose-purple, the marginal ones scarcely larger than the others; pappus none or a ring of minute scales; plant scabrous..........2. *C. nigra*

  b. Leaves all pinnatifid; green bodies of the involucral bracts conspicuous; flowers purplish, the marginal ones falsely radiate; pappus of stiff bristles about as long as the achenes; plant slightly pubescent or villous..................3. *C. Scabiosa*

1. C. CYANUS L. [T] Bachelor's Button. Cornflower
Sea beach (Fla.); sandy flats near a stable (St. Tharsicius); oat field (Car.); clearing (Car.).
European: escaped from cultivation in N.A.

2. C. NIGRA L. [Hp] Knapweed. Spanish Buttons
Fields and roadsides (Lou.; For.; Gpe.; Dou.; Pcé.; Drt.; Caplan; Car.; Nou.; Mat.; Routhierville; Sayabec).
European: naturalized in temperate N.A.

3. C. SCABIOSA L. [Hp] Star Thistle
Habitat not stated (Car.).
European: naturalized in temperate eastern N.A.

17. TANACETUM L.
(Tansy)

a. Plant glabrous; heads numerous; rays scarcely exceeding the disk; leaflets cut-toothed; fields and roadsides...1. *T. vulgare*

a. Plant hairy or woolly when young; heads 1-8, 1-2 cm. in diameter; rays distinctly exceeding the disk; lobes of leaves oblong; river gravels.........................
....2. *T. huronense*, var. *johannense*

1. T. VULGARE L. [Hs] Common Tansy
   Roadside (Bic; Rim.; Pte. au Père; Nou.; Amqui).
   European: naturalized throughout temperate N.A.

2. **T. huronense** Nutt., var. **johannense** Fernald, Rhod. 37: 334. 1935. [Hs]
   Calcicole: river gravels (Mat.; Res.).
   Temperate eastern American: e. Que. to N.B. and Me.

18. Cotula (Tourn.) L.

1. C. CORONOPIFOLIA L. [Hp]
   Halophyte: salt marshes (Bon.; Mar.).
   South African (maritime): introduced along the coasts of temperate N.A.

19. Artemisia L.
(Wormwood)

[Hall and Clements: The phylogenetic method in taxonomy; Carnegie Inst. Wash. Publ. 326: 31-156. 1923. Fernald: Some varieties of Artemisia borealis; Rhod. 29: 93-95. 1927. Marie-Victorin et Rousseau: Les Artemisia de la section Dracunculus dans le Québec; Naturaliste Canadien 71: 176-200. 1944.]

a. Receptacle smooth.
  b. Disk-florets perfect but sterile; heads 3-4 mm. high, 3-6 mm. broad; leaf segments linear to linear-lanceolate; native species of exposed cliffs and ledges.
    c. Stems scape-like, with entire or scarcely divided leaves; involucral bracts obovate; corolla of tube-florets very narrow and cylindrical.........1. *A. borealis*
    c. Stems not scape-like, bearing 3-7-divided leaves; involucral bracts ovate; corolla of tube-florets flask-shaped....................................2. *A. canadensis*
  b. Flowers all fertile, a few pistillate, the others perfect.
    c. Plant glabrous, very green, very leafy, strict; heads in short axillary spikes or clusters, crowded in a slender and glomerulate leafy panicle..........3. *A. biennis*
    c. Plants with leaves white-tomentose at least beneath.
      d. Leaves mostly glabrous and green above, pinnatifid, the divisions often cut-lobed; heads small in open panicles............................4. *A. vulgaris*
      d. Leaves densely white-tomentose on both sides.
        e. Leaves lanceolate or oblong, entire, or the lower somewhat toothed; heads small, numerous, spicate-paniculate........5. *A. ludoviciana*, var. *gnaphalodes*
        e. Leaves obovate to spatulate, pinnatifid into oblong, obtuse, entire or few-toothed lobes; heads large, 6-7 mm. high, 6-9 mm. broad, racemose-glomerulate; plants stout, from a creeping base; sandy shores...6. *A. Stelleriana*

a. Receptacle hairy; flowers all fertile, the marginal pistillate.
  b. Rather shrubby, 6-9 dm. high, silky-hoary; leaves 2-3-pinnately parted, the lobes lanceolate; heads hemispherical, panicled........................7. *A. Absinthium*
  b. Low, 1·5-5 dm. high, in tufts, slightly woody at the base, white-silky; leaves pinnately parted and 3-5-cleft, the divisions narrowly linear; heads globose, racemose...8. *A. frigida*

1. **A. borealis** Pall. [Gr]
   Calcicole: talus below sea cliffs (For.).
   Alpine serpentine barrens (Alb.).
   Arctic circumpolar, alpine: Alaska, Yukon, Mack. (n. coast; Great Bear L.), Melville I., Victoria I., Hudson Bay (Chesterfield Inlet, Hudson

Str.), Baffin, n. Lab., and Nfld., southw. to Colo. and Gaspe; w. Greenland; arctic and alpine Eurasia.

Forma *typica*, a low plant, pubescent in maturity, with short-petioled leaves and glabrous involucre, is the form to which the above plants have been assigned by Victorin and Rousseau (Naturaliste Canadien 71: 176. 1944). Other forms cited for our area are:

Forma *Purshii* (Besser) Victorin and Rousseau (var. *Purshii* Besser), similar to forma *typica* but with pubescent involucre, collected on Mt. Albert, Mt. Logan, and Mt. Pembroke.

Forma *Adamsii* (Besser) Victorin and Rousseau (var. *Adamsii* Besser), differing from the above forms by being glabrous or almost so at maturity, collected from a ravine in the serpentine tableland of Mt. Albert.

Forma *Wormskjoldii* (Besser) Victorin and Rousseau (var. *Wormskjoldii* Besser), a tall plant (about 30 cm.) with long-petioled basal leaves, collected from Mt. Albert.

2. **A. canadensis** Michx. [Gr]

Calcicole: sea cliffs and ledges (Bic; Gro.; Trl.; Srl.; Marsouins; Prr.; Lou.; Plr.; Ren.; For.; Pcé.); river gravels (Cap Chat).

Boreal circumpolar: B.C. and Mack. to Lab. and Nfld., southw. to Ariz. and Vt.; Eurasia.

Forma *rupestris* Victorin & Rousseau, an ashy-tomentose, generally decumbent plant with leaf-segments 1·5-3 mm. broad and compact panicle (Naturaliste Canadien 71: 192. 1944) is the form to which the above plants have been referred.

Forma *pumila* Victorin & Rousseau, a dwarf, glabrous plant almost reduced to the very dense inflorescence, the leaf-segments subsetaceous (0·3-0·5 mm. broad) (Naturaliste Canadian 71: 197. 1944), has been collected from the dry gravel spit of Paspébiac, the type station.

Forma *peucedanifolia* (Jussieu in Besser) Victorin & Rousseau, a glabrous plant with subsetaceous leaf segments, the lax panicle much branched in age (Naturaliste Canadien 71: 194. 1944), has been collected at Carleton.

3. A. BIENNIS Willd. [Hs] Biennial Wormwood

Dry gravel spit (Pas.; Car.); sandy beach (Gpe.).

Western American: B.C. and Mack. to e. Que. (introduced in the East), southw. to Calif. and N.J.

4. A. VULGARIS L. [Hpr] Common Mugwort

Fields and roadsides (Bic); common throughout the peninsula.

Eurasian: naturalized in temperate N.A.

5. A. LUDOVICIANA Nutt., var. GNAPHALODES (Nutt.) T. & G. [Hs] (*A. gnaphalodes* Nutt.) Western Sage

Sea beach (Bic).

Western American: B.C. to s. Ont. and Mich., southw. to Tex., Ark., Ill., and Mexico; naturalized eastward to Que., N. Eng., N.J., and Del.

6. A. STELLERIANA Bess. [Ch (semi-shrubby)] Dusty Miller. Beach Wormwood

Sea beaches (Bic; Ste. Luce; Pte. au Père; R. Blanche).

Asiatic (maritime): naturalized in temperate eastern N.A.

7. A. ABSINTHIUM L. [Ch (semi-shrubby)] Absinth

Shores, rocks, and waste places (Bic; Rim.; Mét.; Dan.; Pas.; New Carlisle; Car.; Mat.; Amqui).

European: naturalized throughout temperate N.A.

8. A. frigida Willd. [Ch (semi-shrubby)] Pasture Sagebrush

Gravelly pastures and fields (Sacré-Cœur; Rim.; Mét.; Cap Chat; Méchins); sandy terraces (Lou.).

Disjunct American: Alaska, Yukon, Mack. (Mack. R. Delta), Sask., Man., southw. to Ariz. and Tex.; n. shore of L. Superior; e. Que.

20. ANTENNARIA Gaertn.
(Everlasting. Pussytoes)

[Fernald: The dwarf Antennarias of northeastern America; Rhod. 26: 95-102. 1924. Fernald: Key to Antennarias of the "Manual Range"; Rhod. 47: 221-235, 239-247. 1945. Cronquist: Notes on the Compositae of the northeastern United States; Rhod. 47: 182-184. 1945; 48: 116-121. 1946.]

a. Larger basal leaves 1-5 mm. wide, blunt or barely short-mucronate, whitened above; flowering stems 3-15 cm. high.
  b. All the involucral bracts of the pistillate heads deep brown, drab, or blackish; corolla 3-4 mm. long, the lobes purplish; cauline leaves 5-8, all but the lowermost with an oblong-lanceolate, flat, scarious tip 1·5-3 mm. long; alpine...1. *A. vexillifera*
  b. Inner bracts of the pistillate heads white or whitish.
    c. Heads 2-5; involucre not glandular; achenes smooth; upper cauline leaves with oblong-lanceolate scarious appendages 2-3 mm. long; flowering stems 3-7 cm. high, not glandular; alpine..2. *A. Peasei*
    c. Heads 3-9; involucre glandular-viscid; achenes papillose; upper cauline leaves with subulate or involute tips; flowering stems 5-15 cm. high, glandular-hirsute above; sea cliffs...3. *A. subviscosa*

a. Larger basal leaves (2-)5-50 mm. broad, distinctly mucronate or apiculate, green and glabrous to white-tomentose above; involucres whitish, greenish, or pale brown.
  b. Rosette leaves 2-5 cm. broad, 6-10 cm. long, broad-obovate or rhombic-obovate, densely white-tomentose beneath, with 3-7 prominent nerves...........4. *A. fallax*
  b. Rosette leaves (2-)5-20 mm. broad, with only the midrib prominent to the tip.
    c. Middle and upper cauline leaves terminated by a flat or merely involute scarious appendage.
      d. Stolons assurgent (decumbent at base but with definitely ascending tips), rather leafy throughout, but with the terminal leaves much the larger.
        e. Basal leaves bright green and glabrous above, lanate beneath, generally more than 2 cm. long; stem-leaves scattered; styles pale, drying brownish...5. *A. canadensis*
        e. Basal leaves white-tomentose above, oblanceolate or narrowly obovate, 2-5 mm. broad; denuded receptacles as high as or higher than broad; involucres white or whitish, 7-9 mm. high; achenes papillate............6. *A. gaspensis*
      d. Stolons flagelliform, procumbent, bracteate, leafy only at tip.
        e. Styles crimson; heads becoming racemose by development of the rhachis; bracts brownish, with linear whitish tips; basal leaves dull above...7. *A. neglecta*
        e. Styles yellowish; heads corymbose; bracts more or less blotched with brown or purple; basal leaves canescent-tomentose above.......8. *A. appendiculata*
    c. Middle and upper cauline leaves subulate-tipped or mucronate, without a scarious appendage.
      d. Stolons procumbent, elongated or somewhat cord-like below the leafy tip, bracteate; heads in a comparatively loose corymb, never racemose; styles pale, drying brownish...9. *A. petaloidea*
      d. Stolons and basal offshoots rather short and assurgent, forming dense mats.
        e. Involucre greenish or light brown only at base, its firm chartaceous blunt outer bracts mostly 1·4-2 mm. broad; denuded ripe receptacle shallowly and finely pitted, the pits narrower than the intermediate blunt ridges; flowering stems stiffly erect...............................10. *A. rupicola*

e. Involucre tinged with green, purple, or brown, with paler tips, the thin and usually scarious bracts mostly 0·7-1·4 mm. broad; denuded ripe receptacle deeply and coarsely honeycomb-pitted, the pits broader than the thin intermediate walls; flowering stems slender, often becoming somewhat flexuous upon elongation.
  f. Rosette-leaves grey- or greyish-tomentose above.
    g. Flowering stems flexuous upon elongation; rosette-leaves obovate, petioled; corymb open.
      h. Outer and middle bracts of pistillate involucre obtuse to subacute.... ....11. *A. neodioica*
      h. Outer and middle bracts lance- to linear-attenuate.................. ....11c. *A. neodioica*, var. *attenuata*
    g. Flowering stems stiffly erect; rosette-leaves oblanceolate or narrowly obovate, acutish, cuneate at base; corymb subglomerulate, globose or hemispherical..............................11a. *A. neodioica*, var. *interjecta*
  f. Rosette-leaves green and glabrous above, 3-13 mm. wide................. ....11b. *A. neodioica*, var. *chlorophylla*

1. **A. vexillifera** Fernald, Rhod. 26: 99. 1924. [Ch (passive)]

Dry open gravel on alpine tableland-saddle (Mtt.) (type station).

Gulf endemic, alpine: Gaspe and Nfld.; related to the arctic circumpolar *A. alpina* and to a large series of cordilleran American species (*See* Cronquist in Rhod. 48: 116-121. 1946).

2. **A. Peasei** Fernald, Rhod. 26: 101. 1924. [Ch (passive)]

Alpine talus of mica schist (Log.) (type station).

Local endemic, alpine: related to the arctic circumpolar *A. alpina* and to a large series of cordilleran American species.

3. **A. subviscosa** Fernald, Rhod. 16: 131. 1914. [Ch (passive)]

Calcicole: sea cliffs (Bic (type station); Marsouins; Plr.; Mrn.); cliffs above lake (Lac Pleureuse).

Disjunct American: s. Mack. (*See* Raup, Sargentia 6: 244. 1947); e. Que.; w. Greenland; related to the arctic circumpolar *A. alpina* and to a large series of cordilleran American species (*See* Cronquist, Rhod. 48: 119. 1946).

4. **A. fallax** Greene. [Ch (passive)] Ladies' Tobacco

Slaty field (Bic).

Temperate eastern American: Minn. to e. Que., southw. to Tex., Miss., Ind., and Va., and in the mts. to Ga.

5. **A. canadensis** Greene. [Ch (passive)]

Dry fields (Bic; Bon. I.); sea cliffs (For.); dry river bank (Yrk.); seashore (Bic); by subalpine brook (Alb.).

Temperate American: Man. to e. Que., southw. to Wyo. and Conn., and in the mts. to Va.

6. **A. gaspensis** Fernald. [Ch (passive)] (*A. neodioica*, var. *gaspensis* Fernald, Ottawa Nat. 19: 156. 1905: *See* Rhod. 35: 341. 1933.)

Calcicole: sea cliffs (Marsouins; Lbn.; For.; Pcé. (type station); Bon. I.); inland cliffs (Tra.); river ledges (Gnd.; Nou.); dry field (Lou.); gravels of spit (Car.); dry alpine schists (Pem.; Nic.).

Gulf endemic: e. Que., Anticosti, and w. Nfld.

7. **A. neglecta** Greene. [Ch (active)]

Dry fields (Bic; Rim.); river ledges (Rim.).

Temperate eastern American: Minn. to e. Que., southw. to Kans., Mo., Ind., and Va.

8. **A. appendiculata** Fernald, Rhod. 23: 295 (footnote 1). 1921. [Ch (active)]

Dry wooded knolls of river bank (Gnd.).

(Arctic-)boreal eastern American: w. Ungava, Gaspe, Anticosti, and Nfld.

9. **A. petaloidea** Fernald. [Ch (active)]

Sea cliffs (Bic); river gravels (Yrk.).

Temperate eastern American: Wis. to e. Que., southw. to Mich. and W. Va.

10. **A. rupicola** Fernald. [Ch (passive)] (*A. neodioica*, var. *rupicola* Fernald.)

Calcicole: river ledges (Bon.; Nou.; Mat.; Res.).

Disjunct American: s. Yukon, Mack. (Great Bear L.), and n. B.C. (*See* A.E. Porsild in Sargentia 4: 73. 1943); Great Lakes region; Gaspe to Nfld., southw. to Me.

11. **A. neodioica** Greene. [Ch (passive)]

Calcicole: sea cliffs (Bic; Cap Chat; St. Majorique; Pcé.; Pas.); river ledges (Ann.; Mat.); inland cliffs (Tra.); cliffs above lake (Lac Pleureuse); dry fields (Beauséjour; Lou.); conifer woods on limestone cliffs (Gpe.).

(Boreal-)temperate eastern American: Wis. to s. Nfld., southw. to Ind. and Va.

11a. **A. neodioica,** var. **interjecta** Fernald, Rhod. 35: 345 (footnote 1). 1933.

Calcicole: sea cliffs and ridges (Bic); dry gravelly woods by river banks (Gnd.); habitat not stated (Ann.; Trl.; Car.; Log.).

Temperate eastern American: Ont. (n. shore of Lake Superior) and e. Wis. to e. Que.

11b. **A. neodioica,** var. **chlorophylla** Fernald, Rhod. 23: 296. 1921.

Sandy field (Bic); habitat not stated (Pcé.).

Temperate eastern American: e. Wis. to n. shore of Lake Superior; e. Que.

11c. **A. neodioica,** var. **attenuata** Fernald.

Dry soil and ledges (Cap Chat; Ann.; Lou.; St. Majorique; For.; Gpe.; Pcé.; Tra.; Car.); dry alpine and subalpine ledges (Pem.; Nic.).

Range of the species.

21. ANAPHALIS DC.
(Pearly Everlasting)

[Fernald: Anaphalis margaritacea again; Rhod. 40: 218-219. 1938. Hara: Anaphalis margaritacea; Rhod. 41: 390-391. 1939.]

a. Plants 2-9 dm. high; leaves linear-lanceolate; heads numerous, in an open corymb.
  b. Leaves rather broadly linear-lanceolate, not reduced in length just below the inflorescence, glabrous or nearly so, and green on the upper side..1. *A margaritacea*

b. Leaves linear to narrowly linear-lanceolate, much reduced upward towards the inflorescence.
  c. Leaves cobwebby on both sides............1a. *A margaritacea,* var. *intercedens*
  c. Leaves bright green and glabrous above......1b. *A margaritacea,* var. *angustior*

a. Plants dwarf; leaves comparatively wide; heads showy, few, in a crowded cluster ....1c. *A. margaritacea,* var. *subalpina*

1. **A. margaritacea** (L.) B. & H. [Hpr] (*A. margaritacea,* var. *occidentalis* Greene.)

Sea cliffs (Cld.; Prr.; Ren.; Pcé.); river ledges and gravels (Ann.; Drt.; Gnd.; GCa.); fields and roadsides (Bic; Rim.; Mét.); sea beach (Trl.); alpine slopes (Alb.).

Boreal American: Alaska to Lab. and Nfld., southw. to Oreg. and Pa.; e. Asia.

1a. **A. margaritacea,** var. **intercedens** Hara. (*A. margaritacea* of Gray's Man., ed. 7, and Fernald & Wiegand, Rhod. 13: 26. 1911; var. *revoluta,* f. *arachnoidea* Fernald, Rhod. 40: 219. 1938.)

"Clearings and dry sterile soil, eastern Quebec...."; fields (Rim.).

Range of the species.

1b. **A. margaritacea,** var. **angustior** (Miquel) Nakai, Bot. Mag. Tokyo 40: 148. 1926. (*A. margaritacea,* f. *anochlora* Fernald, Rhod. 24: 205. 1922.)

Dry fields (Mét.; Gnd.).

Range of the species.

1c. **A. margaritacea,** var. **subalpina** Gray, Fl. N.A., p. 233, 1886.

Shickshock Mountains (according to Fernald).

Disjunct American: Alaska to Colo.; Gaspe and Nfld. to Sable I.

22. GNAPHALIUM L.

(Cudweed)

a. Bristles of the pappus distinct; achenes smooth or scabrous; heads capitate or short-spicate; low diffuse or tufted plants.
  b. Stems diffusely branched from the base, 5-20 cm. high, appressed-woolly; leaves linear or oblanceolate, obtuse or obtusish; heads small, in terminal sessile capitate clusters subtended by leaves; outer involucral bracts obtuse or obtusish and more or less woolly ....1. *G. uliginosum*
  b. Stems much tufted, white-woolly, simple, 2-8 cm. high; leaves linear, acute; heads solitary to several, capitate or short-spicate; bracts acute, glabrous..2. *G. supinum*

a. Bristles of the pappus united at the very base into a ring and falling off all together; heads in a loose, elongated, leafy spike; achenes hispidulous; stems simple, erect.
  b. Bracts dark brown; stem-leaves lanceolate-spatulate............3. *G. norvegicum*
  b. Bracts yellowish or greenish, with a dark spot at or just below the apex; stem-leaves linear ....4. *G. sylvaticum*

1. **G. uliginosum** L. [T] Low Cudweed

Roadside (Drt.; Pcé.); fields (Bic); gravels above beach (Bic); habitat not stated (Mét.; Gnd.; Pas.; Bon.; Car.).

Boreal circumpolar: B.C. and Alb. (Wood Buffalo Park) to Nfld., southw. to Colo., Ind., and Va.; s. Greenland; Iceland; Eurasia.

2. **G. supinum** L. [Ch (cushion)] Mountain Cudweed

Open alpine slopes (Tbl.).

(Arctic-)boreal circumpolar, alpine: gap in western N.A.; Hudson Bay to n. Lab., southw. in the mts. to N.H.; Greenland; Iceland; Faeroes; arctic and alpine Eurasia.

3. **G. norvegicum** Gunner. [Hp] Britton & Brown, Illus. Fl. 3: 456. 1913.

Alpine tableland (Tbl.); calcareous alpine meadow (Tbl.); brook ravines and wet slopes (Alb.; Log.; Mtt.).

Arctic circumpolar, alpine: gap in western N.A.; Baffin, Ungava Bay, Nfld., and Gaspe; w. and e. Greenland; Iceland; arctic and alpine Eurasia.

4. **G. sylvaticum** L. [Hp] Wood Cudweed

Sea cliffs (Bic; Lbn.; Pcé.); open places (Baie des Sables; Yrk.; Val d'Espoir; Cha.; Oie; GCa.; Irn.); conifer woods (Bic; Rim.; Cap Chat; Val.; Ros.; Gnd.; Car.; Sayabec); dry fields (Mét.; Dou.; New Richmond); brackish soil (Newport); clay banks (Drt.).

Arctic circumpolar: gap in western N.A.; Baffin to Nfld., southw. to Me.; Greenland; Iceland; arctic Europe; eastern Asiatic area fragmentary.

23. PETASITES (Tourn.) Mill.
(Sweet Coltsfoot)

a. Leaves reniform, palmately divided to near the base into 7-9 obovate dentate divisions, white-tomentose beneath; lobes of the hermaphrodite flowers longer than the throat; pappus in fruit 8-10 mm. long ....1. *P. palmatus*

a. Leaves triangular to deltoid-cordate, 3-9-lobed halfway to the base or less, the lobes sinuate-toothed, white-tomentose beneath; lobes of the hermaphrodite flowers shorter than the throat; pappus in fruit 12-15 mm. long ....2. *P. vitifolius*

1. **P. palmatus** (Ait.) Gray. [Grh]

Cedar swamp (Bic); woods (Rim.; Cap Chat; Car.; Nou.; Mét.); alluvial river flats (Mtn.; Bon.); river gravels (Cld.; Jhn.; Portage; Gnd.); subalpine and alpine meadows (Tbl.; Log.; Mtt.); wet ground near tree line (Alb.).

(Arctic-)boreal American: Alaska, Yukon, Mack. (Great Bear L., Great Slave L.), Sask., Man., James Bay, n. Lab., and Nfld., southw. to Minn. and Mass.

2. **P. vitifolius** Greene. [Grh] (*P. trigonophyllus* Greene.) N. Am. Fl. 34: 313. 1927.

Calcareous alpine meadow (Tbl.); wet places near alpine brook (Tbl.); alpine meadow (Log.).

(Arctic-)boreal American, alpine: Yukon, Mack., n. Alb., central Man., the Great Lakes, n. Lab., and Anticosti, southw. in the mts. of B.C., Alb., and Gaspe.

24. SENECIO (Tourn.) L.
(Groundsel. Ragwort)

[Greenman: Monograph of the North and Central American species of the genus Senecio, Part 2; Ann. Missouri Bot. Gard. 2: 573-626. 1915; 3: 85-194. 1916. Fernald: Some Senecios of eastern Quebec and Newfoundland; Rhod. 26: 113-122. 1924. Fernald: Senecio aureus and its geographic varieties and allies in eastern North America; Rhod. 45: 495-509. 1943.]

a. Annuals; stems leafy to the inflorescence; heads medium sized, 1 cm. or less high during anthesis, discoid or with minute rays.

b. Heads discoid, several or numerous in the corymbs; achenes hirtellous; calyculate bracts of the involucre distinctly black-tipped; leaves deeply lobed or incised, dentate; plants glabrate ....1. *S. vulgaris*

b. Heads radiate, the rays inconspicuous; bracts not black-tipped.

c. Plants viscid and heavy-scented; heads few in the corymbs, 6-8 mm. broad; lower bracts one-third to one-half the length of the involucre; leaves pinnatifid with toothed segments or 2-pinnatifid........................2. *S. viscosus*

c. Plants somewhat pubescent; heads several or numerous in the corymbs, about 4 mm. broad, usually swollen at the base; lower bracts minute; leaves pinnatifid with unequal lobes, the upper sessile and sagittate at the clasping base...3. *S. sylvaticus*

a. Biennials or perennials.

b. Heads large, 2-5 cm. broad, 1·5-2 cm. high during anthesis; stems stout, 0·5-10 dm. high, leafy above, often nearly naked below; leaves oblong-lanceolate to subovate, 5-15 cm. long, 1-5 cm. broad, repand-dentate to subentire. .4. *S. Pseudo-Arnica*

b. Heads smaller, in anthesis 1-2 cm. broad, about 1 cm. long; stem-leaves deeply lobed or pinnatifid, the basal ones lobed or toothed.

c. Stems leafy to the inflorescence, the stem-leaves 2-3-pinnatisect; heads radiate, very numerous, 12-16 mm. broad, short-peduncled in large compact corymbs; plants arachnoid-tomentulose to nearly glabrous................5. *S. Jacobaea*

c. Stems mostly leafy below, nearly naked above, the upper leaves reduced; plants glabrous or nearly so (except No. 7b), the stems sometimes tomentose at the base.

d. Basal leaves truncate at base, lanceolate to slightly oblong-lanceolate, usually thin, sharply and somewhat unequally dentate-serrate, 1-4 cm. broad; heads radiate, 16-20 mm. broad, several or many in an open corymb; rays 6-12...6. *S. Robbinsii*

d. Basal leaves gradually narrowed at the base, oblanceolate, crenate-dentate to rather sharply dentate-serrate, 0·3-3 cm. broad................GROUP I

d. Basal leaves abruptly narrowed at the base, tending to be elliptic or oval but sometimes oblanceolate, crenate-dentate, 0·7-4·5 cm. broad....GROUP II

d. Basal leaves cuneate, truncate to subcordate at base, oblong to reniform, coarsely dentate to incisely toothed or pinnatifid.................GROUP III

d. Basal leaves shallowly to deeply cordate at base, oblong-oval to suborbicular, 1·5-12 cm. broad, dentate with rounded or blunt teeth or, if sharply serrate, with a deep sinus ....GROUP IV

GROUP I

a. Plants nearly or quite glabrous above, slightly woolly at the base.

b. Basal leaves 0·3-1 cm. broad; lower and median cauline leaves very slender, mostly 1-6 mm. broad; upper leaves much reduced, linear or subulate and almost entire ....7. *S. pauperculus*

b. Basal leaves larger, mostly 0·8-3 cm. broad; lower and median cauline leaves larger, the largest 0·6-2·5 cm. broad; upper leaves mostly well developed and pinnatifid ....7a. *S. pauperculus*, var. *Balsamitae*

a. Plants with densely and permanently tomentose involucres, the tomentum at the base of the involucre or, in some plants, extending to the tips of the bracts; basal leaves 1-2 cm. broad ....7b. *S. pauperculus*, var. *neoscoticus*

GROUP II

a. Stems 2-6 dm. high; basal leaves 3·5-8 cm. long, 1·5-4·5 cm. broad; flowering stem very leafy, the larger cauline leaves 5-12 cm. long, 1-3 cm. broad; pedicels mostly 2-10 cm. long; achenes 2·5-3 mm. long ....8. *S. gaspensis*

a. Stems 0·2-2 dm. high, stiffly erect, often much tufted; basal blades 1-8 cm. long, 0·7-2·5 cm. broad; flowering stem nearly naked except at base or with greatly reduced leaves 1-3·5 cm. long and rarely 1 cm. broad; pedicels 0·2-5 cm. long; achenes 2·4-2·6 mm. long ....8a. *S. gaspensis*, var. *firmifolius*

GROUP III

a. Heads normally discoid.
  b. Corolla lobes orange-red to deep red; achenes dark red-brown, plump, 3-3·5 mm. long; mature involucre rotate or loosely reflexed; denuded receptacle smooth and nearly flat; leaves thick and fleshy; stems rather stout............9. *S. pauciflorus*
  b. Corolla lobes yellow; achenes drab or grey-brown, slender, strongly ribbed, 2-3 mm. long; mature involucre strictly reflexed; denuded receptacle convex, conspicuously alveolate; leaves membranous; stems slender......................10. *S. indecorus*

a. Heads radiate, solitary to few; involucral bracts 6-8 mm. long, acuminate, often purplish; stems 0·5-2(-3) dm. high; lower leaves petiolate, rotund-ovate, sublyrate or irregularly pinnately divided, crenate to sharply dentate; upper stem-leaves sessile, often reduced to lance-attenuate entire bracts......................11. *S. resedifolius*

GROUP IV

a. Basal leaves dentate with rounded or blunt teeth.
  b. Undivided basal leaves suborbicular to round-ovate, broadly rounded at summit, with a well-defined cordate base, becoming firm and subcoriaceous, the larger ones 6-15 cm. long, 3-12 cm. broad......................12. *S. aureus*, var. *intercursus*
  b. Undivided basal leaves oblong-oval, rounded to base or some of them barely subcordate, the larger blades 2-6·5 cm. long, 1·5-4·3 cm. broad, submembranaceous.. ....12a. *S. aureus*, var. *semicordatus*

a. Basal leaves sharply serrate or dentate at least at base to acutely or subacutely lacerate, ovate or oval to rotund, deeply cordate, acute to rounded at tip, membranaceous.... ....12b. *S. aureus*, var. *aquilonius*

1. S. VULGARIS L. [T] Common Groundsel

Sea ridges, cliffs, and boulders (Bic; R. Blanche; For.); near a garden (Bic); roadside (Fla.; Val.; Irn.); railway ballast (Mat.); sea beach (Bic; Lou.; Gpe.; Pas.).

European: naturalized throughout temperate N.A.

2. S. VISCOSUS L. [T] Fetid Groundsel

Railway ballast (Gpe.; New Carlisle; Mat.); waste places (New Carlisle).

European: naturalized along the Atlantic coast of N.A. from e. Que. to N.C.

3. S. SYLVATICUS L. [T] Wood Groundsel

Sea beach (Gpe.); conifer woods (Gpe.).

European: naturalized along the Pacific and Atlantic coasts of N.A.

4. **S. Pseudo-Arnica** Less. [Hpr] Seabeach Senecio

Psammophilous halophyte: gravels of upper beach (Bic; Pte. au Père; Fla.; Mét.; Baie des Sables; R. Blanche; Ste. Ulric; Cap.; Ann.; Trl.; Plr.).

Disjunct American (maritime): Aleutian Is. and Alaska to Vancouver I.; n. Lab. and Nfld. to Me.; coast of e. Asia from Bering Strait to Japan and n. Korea.

Forma *Rollandii* (Victorin) Fernald (var. *Rollandii* Victorin; *S. Rollandii* Victorin; *See* Rhod. 47: 257 (footnote 1). 1945), with rays very short, scarcely exceeding the disk-florets, the whole plant reddish, little or not at all woolly, has been collected along the beach at Ste. Flavie. Its type station is in the Mingan Islands.

5. S. JACOBAEA L. [Hs]

Ballast-filling about fish-houses (Yrk.).

European: naturalized in temperate eastern N.A.

6. **S. Robbinsii** Oakes. [Hsr]

Calcicole: river gravels (Ann.).

Temperate eastern American: Gaspe to N.Y.

7. **S. pauperculus** Michx. [Hs]

Calcicole: sea cliffs (Pcé.); river gravels and ledges (Rim.; Mtn.; Drt.; Jhn.; Gnd.; Bon.).

Alpine serpentine cliffs (Alb.).

Boreal American, alpine: central Alaska, s. Yukon, Mack. (Great Bear L.), Hudson Bay (Churchill), n. James Bay, s. Lab., and Nfld., southw. to n. Mich. and n. Me.

7a. **S. pauperculus,** var. **Balsamitae** (Muhl.) Fernald. (*See* Fernald, Rhod. 23: 299. 1921.)

Calcicole: sea cliffs (Prr.; Lbn.; For.; Pcé.); river gravels (Mtn.; Portage; Drt.; Jhn.; Gnd.; Bon.; PCa.; Res.).

More southerly than the species.

Var. *Balsamitae,* forma *inchoatus* Fernald, with heads discoid (Rhod. 30: 226. 1928), has been collected from talus of sea cliffs at Cap des Rosiers, the type station.

7b. **S. pauperculus,** var. **neoscoticus** Fernald, Rhod. 45: 502. 1943.

Calcicole: gravelly bank (Pcé.).

Temperate eastern American: Gaspe and N.S.

8. **S. gaspensis** Greenm. [Hsr]

Calcicole: sea cliffs and talus (Prr.; Pcé. (type station); Bon. I.); river ledges and gravels (Drt.; Mat.); alluvial thickets of river flats (PCa.); cliffs above lake (Lac Pleureuse).

(Boreal-)temperate eastern American: Anticosti and Gaspe to the upper St. John River, Me.

Forma *verecundus* Fernald (*S. pauperculus,* f. *verecundus* Fernald, Rhod. 30: 225. 1928; *See* Rhod. 45: 505. 1943), with heads discoid, has been collected from ledges of Matapedia River.

8a. **S. gaspensis,** var. **firmifolius** (Greenm.) Fernald. (*S. Balsamitae,* var. *firmifolius* Greenm., Rhod. 7: 244. 1905: *See* Fernald, Rhod. 45: 505. 1943.)

Calcicole: sea cliffs (Plr.; Pcé. (type station)); river ledges (Bon.; Res.); ledges by lake (Lac Pleureuse).

Gulf endemic: Côte Nord, Anticosti, Gaspe, Nfld.

9. **S. pauciflorus** Pursh. [Hsr]

Calcicole: cedar swamp (Mont Joli); calcareous alpine meadow and cliffs (Tbl.); wet alpine shelves and talus (Mtt.; Log.; Pem.).

Disjunct American, alpine: Alaska, Yukon, Mack. (Great Slave L.), southw. in the mts. to Wyo. and Calif.; n. shore of Lake Superior; n. Lab., Nfld., and Gaspe.

10. **S. indecorus** Greene. [Hsr]

Calcicole: sea cliffs and ridges (Bic; Gro.); river gravels (Ann.); cedar swamp (Car.); meadows and swamps in slaty region (Bic).

Boreal American: Yukon, Mack. (Great Bear L.), n. Alb., Sask., and Man. (Churchill), James Bay, s. Que. (Lake St. John), to Gaspe, southw. to n. Calif., Idaho, the Great Lakes, and Temiscouata co., Que.

11. **S. resedifolius** Less. [Hsr]

Calcicole: alpine schistose cliffs and talus (Log.; Ftn.; Pem.).

Disjunct American, alpine: Aleutian Is., Alaska, Herschel I., Mack R. Delta; Gaspe Peninsula and w. Nfld.; central and eastern Asia.

12. **S. aureus** L., var. **intercursus** Fernald, Rhod. 45: 499. 1943. [Hs]

Calcicole: sea cliffs (Srl.; Lbn.); swamps near river mouths (PCa.; GCa.); river gravels (Ann.; Drt.).

Temperate eastern American: Mich. to Gaspe, southw. to Mo. and Ala.; somewhat more northern than the typical form.

12a. **S. aureus**, var. **semicordatus** (Mack. & Bush) Greenm. (*S. aureus* × *Balsamitae* Greenm.)

Calcicole: river ledges and gravels (Bon. (type station); Mat.); river alluvium (Gnd.).

Boreal-)temperate eastern American: Ont. to Nfld., southw. to Ill. and Mo.; more northern than the typical form.

12b. **S. aureus**, var. **aquilonius** Fernald, Rhod. 45: 500. 1943.

Calcicole: river ledges and gravels (Rim.; Ann.; Mad.; Drt.; Yrk.; Gnd.; Pab.; Bon.; PCa.; GCa.; Mat.; Res.); trail in conifer woods (Val.; Bon. I.); calcareous alpine meadow (Tbl.).

Halophyte: brackish swamp (Bnc.).

(Boreal-)temperate eastern American: Wis. to Nfld., southw. to Ind. and Pa.; more northern than the typical form.

Var. *aquilonius*, forma *ecoronatus* Fernald (*S. pseudaureus*, forma *ecoronatus* Fernald, Rhod. 30: 225. 1928; *See* Rhod. 45: 502. 1943), with heads discoid, has been collected from a springy meadow in woods by the North Fork of Madeleine River, the type station.

25. CIRSIUM (Tourn.) Hill
(Thistle)

a. Bracts of the involucre all tipped with spreading spines, cottony; heads 4-5 cm. broad, the flowers dark purple; leaves rough and bristly above, brown-tomentose with deciduous webby hairs beneath, strongly decurrent on the stem, the wings prickly-lobed..1. *C. lanceolatum*

a. Bracts of the involucre appressed, unarmed or barely prickly-pointed; leaves not bristly above, slightly woolly beneath, not decurrent; stems striate; flowers normally purple.

  b. Bracts of the involucre pointless or barely mucronate; heads few, 3-4 cm. broad; leaves deeply pinnatifid; plants not stoloniferous.

c. Bracts of the involucre white-arachnoid and viscid; heads scattered; stems tall, 1-2·5 m. high, loosely branched..2. *C. muticum*
c. Bracts of the involucre dark, purplish green, nearly glabrous; heads 3-5, sessile in a terminal glomerule; stems low, 3-6 dm. high, very strict...2a. *C. muticum*, var. *monticola*

b. Bracts of the involucre not viscid, the outer ones barely prickly-pointed; heads numerous, 2-2·5 cm. broad; leaves strongly sinuate-pinnatifid; plants strongly stoloniferous...3. *C. arvense*

1. C. LANCEOLATUM (L.) Hill. [Hs] Bull Thistle

Roadside (Bic); sea beach (Bic); gravel bar (Cha.); habitat not stated (Dou.).

Eurasian: naturalized throughout temperate N.A.

2. **C. muticum** Michx. [Hs] Swamp Thistle

Field (Bic); swampy soil (Bic; Mét.); river gravels (Drt.; PCa.; Mat.); woods and thickets (Sacré-Cœur; Drt.; Car.; Nou.). General.

Boreal American: Sask. to s. Lab. and Nfld., southw. to Tex. and Fla.

Forma *lactiflorum* Fernald, with white flowers (Rhod. 35: 369. 1933), has been collected at St. Tharsicius and Ste. Irène.

2a. **C. muticum,** var. **monticola** Fernald. (*Cnicus muticus,* var. *monticola* Fernald, Ottawa Nat. 19: 166. 1905; *See* Rhod. 9: 28. 1907.)

Alpine meadow (Tbl.); boggy alpine tablelands (Alb.) (type station); alluvial thickets by river (PCa.); alpine schists (Log.; Ftn.; Pem.).

Gulf endemic, alpine: Lab., Mingan Is., Gaspe Peninsula.

3. C. ARVENSE (L.) Scop. [Gr] Canada Thistle

Fields (Bic; Mét.; Car.; St. Tharsicius). General.

European: naturalized throughout temperate N.A.

Forma *albiflorum* (R. & R.) Hoffm., with white flowers (Bull. N.Y. State Mus. 243-244: 22. 1923), has been collected at Bic and Pointe à la Garde.

26. EUPATORIUM (Tourn.) L.
(Thoroughwort)

[Wiegand and Weatherby: The nomenclature of the verticillate Eupatoria; Rhod. 39: 297-306. 1937.]

a. Florets pale purple; corymb flattish-topped; bracts of the involucre purple-tinged, numerous, very unequal; leaves whorled, coarsely toothed.
  b. Leaves thickish, ovate to ovate-oblong, rugose, pubescent; inflorescence large, surpassing the bracts and leaves...................................1. *E. maculatum*
  b. Leaves thin, large, ovate-oval, with a tendency towards a 3-ribbed base, elongate, nearly or quite glabrous; inflorescence small, surrounded and usually much surpassed by the bracts and leaves....................1a. *E. maculatum,* var. *foliosum*

a. Florets white; corymbs compound; bracts greenish, fewer, nearly equal; leaves opposite, broadly ovate, long-petioled, sharply toothed................2. *E. rugosum*

1. **E. maculatum** L. [Hpr] (*E. purpureum,* var *maculatum* (L.) Darl.; *See* Wiegand and Weatherby, Rhod. 39: 297-306. 1937.) Joe-Pye Weed

Thickets (Pcé.); railway bank (Bic); sandy flats (Mat.); clay ground (Cha.); sand flats (Mar.); thickets (Rim.; Marsouins); seashore (Bic). General.

(Boreal-) temperate American: B.C. to Côte Nord and Nfld., southw. to N. Mex., Ill., and Pa.

1a. **E. maculatum,** var. **foliosum** Fernald, Rhod. 10: 86. 1908. (*E. purpureum,* var. *foliosum* Fernald; *See* Wiegand, Rhod. 22: 66. 1920.)

Open ground (Drt.).

(Boreal-)temperate eastern American: e. Que. to Nfld., southw. to Me. and N.H.; possibly Lake Superior.

2. **E. rugosum** Houtt. [Hp] (*E. urticaefolium* Reich.; *See* Merrill, Rhod. 40: 293. 1938.)

River banks (Rim.; Ann.; Dan.); sea cliffs (Prr.; Lou.; Pcé.; Bon. I.); thickets (Mét.; Srl.; Ros.; Drt.).

Temperate eastern American: Nebr. to e. Que., southw. to La. and Fla.

27. GALINSOGA R. & P.

1. G. CILIATA (Raf.) Blake. [T] Quickweed

In front of houses (Rim.).

South American: introduced widely throughout the world.

28. HELIANTHUS L.
(Sunflower)

a. Annual; leaves mostly alternate; receptacle flat........................1. *H. annuus*
a. Perennial; lower leaves opposite; receptacle convex or at length low-conical..2. *H. laetiflorus,* var. *subrhomboideus*

1. H. ANNUUS L. [T] Common Sunflower

Fields (Rim.).

Western American: Minn. to Tex. and westw.; introduced in the East.

2. H. LAETIFLORUS Pers., var. SUBRHOMBOIDEUS (Rydb.) Fernald. [Grh] (*H. subrhomboideus* Rydb.; *See* Fernald, Rhod. 48: 79. 1946.)

River gravels (PCa.); waste places (Fla.).

Western American: Alb. and Man., southw. to N. Mex. and Ark.; introduced in the East.

29. CHRYSANTHEMUM (Tourn.) L.

a. Heads large, solitary, terminating the long branches; rays white; involucral bracts narrow, brown-margined.
  b. Basal leaves spatulate-obovate, crenate-dentate; middle and upper stem-leaves oblong or oblanceolate, with large spreading teeth at base......1. *C. Leucanthemum*
  b. Basal leaves pinnatifid, subpinnatifid, or coarsely and irregularly toothed; middle and upper stem-leaves narrowly oblong or oblanceolate, conspicuously subpinnatifid at base..................................1a. *C. Leucanthemum,* var. *pinnatifidum*
a. Heads small, corymbed, numerous.
  b. Rays present, white; leaves bipinnately divided, the divisions ovate, cut..2. *C. Parthenium*
  b. Rays absent; leaves oblong, crenate, the upper sessile, the lower petioled, often with 2 small lateral lobes at base.................3. *C. Balsamita,* var. *tanacetoides*

1. C. LEUCANTHEMUM L. [Hs] Ox-eye Daisy

Fields (Bic; Rim.; New Carlisle; Car.); talus of cliffs (Pcé.); swampy soil (Bic; Cld.).

European: naturalized in temperate eastern N.A.

1a. C. LEUCANTHEMUM, var. PINNATIFIDUM Lecoq & Lamotte.

Fields and roadsides (Bic; Rim.; Mét.; GCa.); sandy soil (Drt.). General.

European: naturalized throughout temperate N.A.

2. C. PARTHENIUM (L.) Pers. [Hp] Feverfew

Ballast-filling about fish-houses (Yrk.).

European: naturalized in temperate N.A.

3. C. BALSAMITA L., var. TANACETOIDES Boiss. [Hs] Costmary

River shore (Dan.).

Asiatic: frequently escaped from gardens in temperate eastern N.A.

30. MATRICARIA (Tourn.) L.
(Wild Chamomile)

a. Ray florets present, white; disk-corollas 5-lobed; involucre 10-15 mm. broad; receptacle hemispheric or ovoid; achenes strongly 3-ribbed; pappus a short crown or border; plants scentless.......1. *M. inodora*

a. Ray florets none; disk-corollas 4-lobed; involucre 5-8 mm. broad; receptacle conic; achenes faintly nerved; pappus obsolete; odour of the bruised plant suggesting pineapple.......2. *M. matricarioides*

1. **M. inodora** L. [T] Wild Chamomile

Shores of river estuaries (Gnd.; Bon.); dry sand (New Carlisle); habitat not stated (Bic; Pas.; PCa.; Car.; Nou.).

Arctic circumpolar: Mack. (Coronation Gulf), Baffin, Melville, Hudson Bay, Nfld., southw. to Oreg. and Conn.; Greenland; Iceland; Eurasia.

2. M. MATRICARIOIDES Porter. [T] (*M. suaveolens* (Pursh) Buch.) Pineapple-weed

Roadsides and waste places (Bic; Rim.; Marsouins; Drt.; Bon.).

Western American: naturalized in temperate eastern N.A. from the Pacific coast; established in Iceland, the Faeroes, and n. Europe.

31. ACHILLEA (Vaill.) L.
(Yarrow. Milfoil)

[Clausen, Keck, and Hiesey: Experimental studies on the nature of species; Carnegie Inst. Wash. Publ. 520: 296-324. 1940. M. P. Porsild: The Greenland Achillea; Meddel. om Groenl. 134 (4): 36-39. 1946.]

a. Leaves linear, serrate or incised, not pinnatifid.
  b. Ligules 1-1·2 mm. long; disk-flowers 25-30; heads numerous in compound corymbiform panicles; leaves incised.......1. *A. sibirica*
  b. Ligules 4-5 mm. long; disk-flowers 50-75; heads few in open, simple, or compound corymbs; leaves finely appressed-serrate, not incised.......2. *A. Ptarmica*

a. Leaves pinnatifid to tripinnatifid.
  b. Bracts with dark brown, almost black, margins.
    c. Involucre 5-6 mm. high, 4-5 mm. broad; outer bracts acutish; achenes 2·5 mm. long, with thick margins; ultimate leaf-divisions with somewhat callous mucronate tips.......4a. *A. Millefolium*, var. *nigrescens*
    c. Involucre 3·5-4 mm. high, about 3 mm. broad; bracts all obtuse; achenes 2 mm. long, narrowly margined; ultimate leaf-divisions spinulose-mucronate.......3. *A. subalpina*

b. Bracts with light brown, yellowish, or straw-coloured margins; involucre 4-4·5 mm. (rarely 5) high, 2·5-4 mm. broad.
  c. Stem arachnoid or nearly smooth; stem-leaves smooth or loosely pubescent...4. *A. Millefolium*
  c. Stem densely woolly; stem-leaves silky-lanate....4b. *A. Millefolium*, var. *lanulosa*

1. **A. sibirica** Ledeb. [Hsr] (*A. multiflora* Hook.; *See* Fernald, Rhod. 31: 219-220. 1929; Rydberg, p. 959; N. Am. Fl. 34: 226. 1916.)

River gravels (Ann.); moist subalpine woods (Alb.).

Disjunct American: Alaska, Mack. (Mack. R. Delta), Alb., and Man.; Gaspe Peninsula; e. Asia.

2. A. PTARMICA L. [Hsr]

River gravels (Mat.); dry sand (Gnd.); waste ground (Gpe.; Pcé.).

Eurasian: adventive in eastern N.A. from Lab. and Nfld. to Mich. and Me.

3. **A. subalpina** Greene. [Hsr]

Moist cliffs (Prr.); hornblende schists by subalpine lake (Lac du Ruisseau du Plaqué-Malade, Alb.).

Disjunct American: B.C. and Yukon to Hudson Bay, southw. to Calif. and N. Mex.; Gaspe Peninsula.

4. **A. Millefolium** L. [Hsr] Common Yarrow

Sea cliffs (Bic; Srl.; Prr.; Lou.; Plr.; Val.; Clr.); river gravels (Drt.; GCa.; Res.); fields (Bic; Irn.); ballast-filling about fish-houses (Yrk.) (distributed as *A. dentifera* DC.); alpine schists (Pem.).

Boreal circumpolar: B.C., Yukon, Mack. (Great Bear L.), to Nfld., southw. to Calif. and Fla.; s. Greenland; Iceland; Faeroes; Eurasia.

Forma *rosea* Rand & Redfield, with rose-purple ligules, has been collected from gravel flats of Matapedia River.

4a. **A. Millefolium,** var. **nigrescens** Meyer. (*A. nigrescens* (Meyer) Rydberg; *A. borealis* Britton, not Bongard.)

Sea cliffs (Bic; Srl.; Prr.; Ros.; Pcé.; Bon. I.; Gnd.; Nou.); sandy alluvium (GCa.); calcareous alpine meadow (Tbl.); alpine meadows and slopes (Alb.; Tbl.; Log.; Pem.).

Boreal circumpolar, alpine: Alaska, Yukon, Mack., Hudson Bay, Lab., and Nfld., southw. to Colo. and N.H.; Greenland; Eurasia.

4b. A. MILLEFOLIUM, var. LANULOSA Piper. (*A. lanulosa* Nutt.)

Sea cliffs (Bic; Lou.; Plr.; Mad.; Val.; Clr.; Bon. I.); railway ballast (Bic); gravelly beaches (R. Blanche; Pas.; Car.).

Western American: B.C. and Yukon to Hudson Bay (Churchill) and Minn., southw. to Calif. and Kans.; introduced in the East.

32. ANTHEMIS (Michx.) L.

(Corn Chamomile)

a. Rays neutral; achenes warty, 1·2-1·5 mm. long; receptacle without chaff near the margin; leaves finely 3-pinnately dissected; plant ill-scented............1. *A. Cotula*

a. Rays pistillate; achenes not warty, about 2 mm. long; receptacle chaffy throughout; leaves 1-2-pinnately and more coarsely divided; plant not ill-scented...2. *A. arvensis*, var. *agrestis*

1. A. COTULA L. [T] May-weed. Dog Fennel
Ballast-filling about fish-houses (Yrk.).
European: naturalized throughout temperate N.A.

2. A. ARVENSIS L., var. AGRESTIS (Wallr.) DC. [T]
Roadside (Ren.).
European: naturalized throughout temperate N.A.

33. RUDBECKIA L.

(Black-eyed Susan)

1. **R. hirta** L. [Hs]

Fields and roadsides (Bic; Rim.; Lou.; Gpe.; Dou.; Gnd.; New Carlisle; Bon.; Nou.).

Temperate American: Man. to e. Que., southw. to Tex., Colo., and Fla.

34. TUSSILAGO (Tourn.) L.

(Coltsfoot)

1. T. FARFARA L. [Grh]

River gravels and ledges (Rim.; Mtn.; Drt.; Bon.); roadsides and waste places (Gpe.; Yrk.; Routhierville).

European: naturalized in temperate N.A.

35. ARNICA L.

(Arnica)

[Fernald: The eastern American representatives of Arnica alpina; Rhodora 26: 103-107. 1924. Maguire: A monograph of the genus Arnica; Brittonia 4: 386-527. 1943.]

a. Stem-leaves 3-5 pairs, all evenly dentate, the upper ones little reduced; stems more or less villous throughout, somewhat glandular above; pappus yellowish brown or olive-tinged, its bristles subplumose; achenes hirsute, 4-5 mm. long; peduncles and involucres glandular-villous..1. *A. lanceolata*

a. Stem-leaves 1-4 pairs (sometimes scattered small bracts above), at least the upper entire or only sparingly toothed; pappus white or whitish, its bristles merely barbellate.
  b. Achenes copiously hirsute from base to summit; lower leaves regularly dentate...2. *A. chionopappa*
  b. Achenes glabrous or nearly so below the middle; lower leaves callous-serrulate, ciliolate on the margins...3. *A. Griscomi*

1. **A. lanceolata** Nutt. [Hsr] (*A. mollis* Torr., not Hook.; *A. mollis*, var. *petiolaris* Fern., Rhod. 7: 149-150. 1905. *See* Maguire, p. 475.)

River ledges and gravels (Rim.; Cap Chat; Ann.; Ren.; Bon.; PCa.; GCa.; Mat.); calcareous alpine meadow (Tbl.); edge of subalpine lake (Lac des Américains, Tbl.); alpine meadows (Tbl.; Mtt.; Log.); alpine schists (Log.); edge of stream below Mt. Albert (Ruisseau du Plaqué-Malade).

Temperate eastern American, alpine: Gaspe and N.B., into the mts. of Me., N.H., and N.Y.; closely related to the cordilleran American *A. amplexicaulis* Nutt. and *A. mollis* Hook.

2. **A. chionopappa** Fernald. [Hsr] (*A. lonchophylla* Greene, subsp. *chionopappa* (Fernald) Maguire; *A. gaspensis* Fernald, Rhod. 7: 148. 1905; *See* Maguire, p. 431.)

Calcicole: sea cliffs (Bic; Gro.; Trl.; Mrn.; Lbn.; Pcé.); dry inland cliffs (Trl.) (type station for *A. gaspensis*); river ledges (Gnd. (type station); Bon.; Nou.).

Gulf endemic: Gaspe, n. N.B., Anticosti I., and Nfld.; closely related to the western *A. lonchopylla* Greene.

3. **A. Griscomi** Fernald, Rhod. 26: 105-106. 1924. [Hsr] (*A. Louiseana* Fern., Rhod. 35: 368-369, in part. 1933; *A. Louiseana,* subsp. *Griscomi* (Fernald) Maguire.)

Calcicole: alpine schistose crests and talus (Mtt.; Log.).

Gulf endemic, alpine: Gaspe and Nfld.; closely related to the western American-eastern Asiatic *A. Louiseana* Farr.

36. INULA L.

(Elecampane)

1. I. HELENIUM L. [Hs]

Fields and roadsides (Cascapédia to New Richmond; Mar.; Car.; Nou.).

Eurasian: naturalized in temperate eastern N.A.

37. SOLIDAGO L.

(Goldenrod)

[Friesner: The genus Solidago in northeastern North America; Butler Univ. Bot. Studies 3: 1-64. 1933. Hart: Keys to goldenrods in Canada and Newfoundland; Can. Dept. of Agric. Publ. 565: 1-31. 1937.]

- a. Rays mostly fewer than the disk flowers; heads all more or less pedicelled.
  - b. Bracts of the much imbricated and rigid involucre with abruptly spreading herbaceous tips; heads in clusters or glomerulate racemes, disposed in a dense, somewhat leafy and interrupted wand-like compound spike....................1. *S. squarrosa*
  - b. Bracts of the involucre without green tips, wholly appressed.
    - c. Heads small, the involucres 2-5 (rarely 6) mm. high, clustered along the stems in the axils of the feather-veined leaves, or the upper forming a thyrse; rays yellow or orange-yellow.
      - d. Achenes hispid or hirsute; stems glabrous or sparingly puberulent.
        - e. Leaves ovate or oval; stems zigzag, angled; achenes hirsute-pubescent...2. *S. flexicaulis*
        - e. Leaves oblanceolate, the basal 2-6 cm. long, 0·6-1·3 cm. wide; stems caespitose, slender, terete, erect or decumbent, 1-3 dm. high; achenes hispid...3. *S. chlorolepis*
      - d. Achenes glabrous.
        - e. Stems glabrous or sparingly puberulent; leaves glabrous, subglabrate or pilose on the nerves beneath; involucres 3-5 mm. high...4a. *S. hispida,* var. *tonsa*
        - e. Stems pilose, not densely matted; leaves pubescent on both surfaces; involucre 4-6 mm. high.......................................4. *S. hispida*
        - e. Stems white-tomentose with densely matted hairs; leaves hispidulous on both surfaces; involucre 5-6 mm. high...........4b. *S. hispida,* var. *disjuncta*
        - e. Stems arachnoid-lanate, with long, white, webby hairs...4c. *S. hispida,* var. *lanata*

c. Heads mostly large, the involucre 5-12 mm. high (3-5 mm. high in No. 5a), many-flowered, forming an erect terminal thyrse or corymb; leaves feather-veined.

d. Inflorescence corymbiform, close, compact; involucres 5-6 mm. high.

e. Involucral bracts 20-30....................................5. *S. multiradiata*

e. Involucral bracts about 15.................5a. *S. multiradiata*, var. *parviceps*

d. Inflorescence axillary.

e. Leaves ovate; achenes 3-4 mm. long, glabrous; involucres 8-12 mm. high.

f. Involucres 4-7 mm. wide; stems 3·5-12 dm. high..........6. *S. macrophylla*

f. Involucres 8-20 mm. wide; stems lower..6a. *S. macrophylla*, var. *thyrsoidea*

e. Leaves elliptic, oblanceolate; achenes 1-2 mm. long, pubescent; involucres 6-8 mm. high...7. *S. calcicola*

d. Inflorescence thyrsoid.

e. Stems 3-8 dm. high, often glutinous; pedicels 3-4 mm. long; involucres 5-6 mm. high...8. *S. Randii*

e. Stems 0·5-3 dm. high; pedicels 5-20 mm. long; involucres 7-10 mm. high.... ....9. *S. mensalis*

c. Heads small or medium-sized, the involucres 2-5 (rarely 6) mm. high (No. 5a may be sought here), panicled or thyrsoidal, not in a terminal corymbiform cyme.

d. Leaves commonly veiny, not 3-ribbed (but sometimes obscurely 3-nerved).

e. Heads in a slender, virgate or thyrsoid panicle; involucral bracts linear-oblong, obtuse; stems glabrous..............10a. *S. uliginosa*, var. *peracuta*

e. Heads paniculate, in mostly spreading or recurved, ascending, secund clusters.

f. Leaves fleshy; plants maritime.........................11. *S. sempervirens*

f. Leaves not fleshy; plants not exclusively maritime.

g. Basal leaves long-petioled, conspicuously larger than the 5-20 linear or linear-lanceolate appressed-ascending stem-leaves; bracts of the involucre pale straw-colour, chartaceous.........................10. *S. uliginosa*

g. Basal leaves similar to the 30-100 or more uniform and gradually reduced, lanceolate or ovate-lanceolate, mostly sharp-serrate stem-leaves.

h. Panicle pyramidal; racemes much exceeding the subtending leaves.... ....12. *S. rugosa*

h. Panicle elongate; racemes equalled or surpassed by the subtending leaves..................................12a. *S. rugosa*, var. *villosa*

d. Leaves more or less plainly 3-ribbed, 2 of the lower veins becoming prominent and elongated parallel with the midrib; heads mostly in 1-sided, chiefly spreading or recurved racemes, forming an ample panicle.

e. Panicle high, pyramidal, the branches recurved, spreading.

f. Involucres 2-3 mm. high; leaves narrowly lanceolate, glabrous above, minutely pubescent on the nerves beneath, the middle ones 6-13 cm. long, 5-18 mm. wide; stems glabrous at least below, often minutely pubescent above..13. *S. canadensis*

f. Involucres 3·2-5 mm. high.

g. Stem closely and minutely pubescent throughout.........14. *S. altissima*

g. Stem glabrous (or except in the inflorescence).

h. Leaves slightly pubescent beneath, especially on the nerves; involucres 3·2-4 mm. high...................................15. *S. gigantea*

h. Leaves smooth on both sides; involucres 3·5-5 mm. high............ ....15a. *S. gigantea*, var. *leiophylla*

e. Panicles rhomboid, the branches not recurving or scarcely so, or virgate; involucres 3-5 mm. high.

f. Stems puberulent, at least above.

g. Leaves subentire or sparingly serrate above the middle............... ....16. *S. lepida*, var. *elongata*

g. Leaves coarsely and sharply serrate..........16a. *S. lepida*, var. *fallax*

f. Stems densely cinereous-tomentulose, viscid......16b. *S. lepida*, var. *molina*

a. Rays more numerous than the disk flowers; inflorescence a flat or round-topped corymb; heads sessile or subsessile; leaves lance-linear, 3-5-ribbed.

b. Branches of the inflorescence glabrous.

c. Leaves long-attenuate; tips sharp..........................17. *S. graminifolia*

c. Leaves not attenuate; tips bluntish..............17a. *S. graminifolia*, var. *major*

b. Branches of the inflorescence hirtellous..........17b. *S. graminifolia*, var. *Nuttallii*

1. **S. squarrosa** Muhl. [Hsr]

Roadside by river (Mat.).

Temperate eastern American: Ont. to e. Que., southw. to Ohio and Va.

2. **S. flexicaulis** L. [Hpr] (*S. latifolia* L.)

Roadside (Bic; Rim.; Ann.); cliffs (Tra.); river gravels (Mat.); habitat not stated (Mét.; Cap Chat; Dan.; Bon.; GCa.). General.

(Boreal-)temperate eastern American: N. Dak. to Nfld., southw. to Kans. and Ga.

3. **S. chlorolepis** Fernald, Rhod. 17: 3. 1915. [Hsr]

Alpine serpentine barrens and brook ravines (Alb.) (type station).

Local endemic, alpine: eastern representative of the cordilleran *S. decumbens* Greene.

4. **S. hispida** Muhl. [Hsr]

Calcicole: sea cliffs and talus (Bic; Rim.; Mtn.; Trl.; Prr.; Lou.; Plr.; For.; Pcé.); river gravels (Ann.; Jhn.; Gnd.; Pab.; Bon.; PCa.; GCa.; Mat.); dry gravels of spit (Car.); calcareous alpine meadow (Tbl.).

(Boreal-)temperate American: Man. to Mingan Is. and Nfld., southw. to Ark., Mo., and Ga.

4a. **S. hispida,** var. **tonsa** Fernald, Rhod. 17: 2. 1915.

Calcicole: sea ridges (Bic); shore (Gpe.).

Gulf endemic: e. Que., Anticosti, Nfld. (serpentine barrens), and N.B.

4b. **S. hispida,** var. **disjuncta** Fernald, Rhod. 17: 2. 1915.

Calcicole: calcareous alpine cliffs (Tbl.).

Gulf endemic, alpine: Gaspe, Nfld.

4c. **S. hispida,** var. **lanata** (Hook.) Fernald. (*S. lanata* Hooker; *See* Fernald, Rhod. 10: 87. 1908). Hooker, Fl. Bor. Am. 2: 4. 1834.

Calcicole: sea cliffs (Lbn.; Pcé.); river gravels (Ann.; Yrk.; Pab.; Bon.; PCa.; GCa.).

Disjunct American: Sask.; Gaspe Peninsula and Nfld.

5. **S. multiradiata** Ait. [Hsr] Britton & Brown, Illus. Fl. 3: 386. 1913.

Calcicole: sea cliffs and talus (Bic Mt.; Lbn.; For.; Pcé.; Bon. I.); calcareous alpine meadow (Tbl.); alpine schists (Log.; Pem.; Ftn.; Bln.).

Alpine serpentine barrens (Alb.).

Arctic American, alpine: Alaska (Seward Pen.), Yukon, Mack. (Mack. R. Delta, Great Bear L.), Somerset I., Hudson Bay (Churchill, n. Que.), s. Baffin, Ungava Bay, n. Lab., and Nfld., southw. to B.C., James Bay, Gaspe, Magdalen Is., and Cape Breton I.

5a. **S. multiradiata,** var. **parviceps** Fernald, Rhod. 38: 202. 1936.

Calcicole: damp sea cliffs (Cap des Rosiers) (type station).

Local endemic.

6. **S. macrophylla** Pursh. [Hpr]

Woods (Bic; Rim.; Mét.; Mtn.; Cld.; Lou.; Gpe.; Pcé.; Drt.; Gnd.; Bon.; Car.; Irn.); subalpine meadow (Log.). General in its habitat.

Boreal eastern American: L. Superior to Lab. and Nfld., southw. to N.Y.

6a. **S. macrophylla,** var. **thyrsoidea** (Meyer) Fernald.

Alpine meadows and woods (Alb.; Tbl.; Log.; Mtt.; Pem.).

(Arctic-)boreal eastern American, alpine: n. Lab., southw. in the mts. of Gaspe, Me., and N.H.

7. **S. calcicola** Fernald. [Hpr]

Calcicole: sea cliffs, boulders, and rich woods (Rim.; Mét.; Trl.); calcareous alpine cliffs (Tbl.).

(Arctic-)boreal eastern American, alpine: n. Lab. and Nfld., southw. to Me.

8. **S. Randii** (Porter) Britton. [Hsr]

Rocky bank (Rim.).

Temperate eastern American: Mich. to e. Que., southw. to N.H. and Mass.

9. **S. mensalis** Fernald, Rhod. 17: 4. 1915. [Hsr]

Calcicole: calcareous alpine cliffs (Tbl.) (type station).

Local endemic, alpine: apparently a derivative of *S. multiradiata.*

10. **S. uliginosa** Nutt. [Hsr] (*S. uniligulata* of Gray's Man., ed. 7; *S. uliginosa,* var. *uliginosa* Cronquist, *See* Rhod. 49: 70-73. 1947.)

Bog (Ste. Luce).

(Boreal-)temperate eastern American: Minn. to Nfld., southw. to Ill., Ind., Ohio, and N.C.

10a. **S. uliginosa,** var. **peracuta** (Fern.) Friesn. (*S. uliginosa* of Gray's Man., ed. 7; *See* Cronquist, Rhod. 49: 70-73. 1947.)

Heath bog (Bic); boggy subalpine meadow (Lac Mont Louis); subalpine spruce swamp (Tbl.); habitat not stated (Pte. au Père; Ann.; Gnd.; Bon.; Nou.).

(Arctic-)boreal American: Man., Keewatin, James Bay, n. Que., and Nfld., southw. to Minn. and N.C.

11. **S. sempervirens** L. [Hsr] Seaside Goldenrod

Calcicole: sea ledges (Bic; Lou.; Bon. I.).
Halophyte: salt marsh at river mouth (PCa.); salt marsh (Mét.).
Psammophilous halophyte: sea beach (Car.).
Temperate eastern American (maritime): e. Que. to Mex. and Fla.

12. **S. rugosa** Mill. [Hpr] Rough Goldenrod

Sea cliffs (Pcé.); bog (Bic); dry field (Dou.).

(Boreal-)temperate eastern American: Ont. to Nfld., southw. to La. and Va.

12a. **S. rugosa,** var. **villosa** (Pursh) Fernald.

Fields and borders of woods (Drt.; Dou.; New Carlisle; Bon.; PCa.).

Boreal eastern American: the common extreme from Lab. to w. Nfld., southw. to w. Que. and n. Me.

13. **S. canadensis** L. [Hsr]

Fields and roadsides (Bic; Rim.; Mét.; Mtn.; Dou.; Pcé.; Gnd.; Bon.; PCa.; Car.; Zén.); railway ballast (Bic); river gravels (Mat.); sandy island (Drt.). General.

Boreal American: B.C. to Lab. and Nfld., southw. to Colo. and W. Va.

14. **S. altissima** L. [Hsr]

Islands in river mouth (Mat.).

(Boreal-)temperate American: Alb. to Nfld., southw. to Tex. and Fla.

15. **S. gigantea** Ait. [Hpr] (*S. serotina,* var. *gigantea* (Ait.) Gray; *See* Fernald, Rhod. 41: 457-459. 1939.)

River gravels (Mat.).

(Boreal-)temperate eastern American: Wis. to Nfld., southw. to Tex. and Fla.

15a. **S. gigantea,** var. **leiophylla** Fernald. (*S. serotina* Ait.; *See* Fernald, Rhod. 41: 457. 1939.)

River gravels and alluvia (PCa.; Mat.).

(Boreal-)temperate American: B.C. to Nfld., southw. to Oreg., Tex., and Ga.

16. **S. lepida** DC., var. **elongata** (Nutt.) Fernald. [Hpr] (*S. elongata* Nutt.; *See* Fernald, Rhod. 17: 9. 1915.)

River gravels (Ann.); fields (Lou.); subalpine thickets (Mtt.; Col.).

Disjunct American: B.C., Mack., and Man., southw. to Calif.; Lab., Nfld., and Gaspe.

16a. **S. lepida,** var. **fallax** Fernald, Rhod. 17: 9. 1915.

Calcicole: river gravels (Ann.; Drt.; Jhn.; Pab.; Bon.); habitat not stated (Trl.; Lou.).

Disjunct American: B.C., Mack., and Man., southw. to Utah; Great Lakes region; Gaspé and Nfld. to Me.

16b. **S. lepida,** var. **molina** Fernald, Rhod. 17: 9. 1915. (*S. canadensis,* var. *gilvocanescens* of Gray's Man., ed. 7.)

Calcicole: sea cliffs (Pcé.) (type station); beach (Ann.).

Temperate eastern American: Mich. to e. Que., southw. to Me.

17. **S. graminifolia** (L.) Salisb. [Hpr]

Calcicole: river gravels (Mat.); gravelly lake shore (Lac du Club, Matane co.); wet places (Rim.). General.

Temperate American: Sask. to Mingan Is. and e. Que., south. to Mo. and N.J., and in the mts. to N.C.

17a. **S. graminifolia,** var. **major** (Michx.) Fernald. (*S. graminifolia,* var. *septentrionalis* Fernald, Rhod. 17: 12. 1915; *S. graminifolia,* var. *tricostata* (Lunell) Harris; *See* Harris, Rhod. 45: 413. 1943, and Fernald, Rhod. 46: 329-330. 1944.)

Calcicole: river gravels (Jhn.; Bon.; PCa.).

Boreal American: Mack. and n. Alb., Hudson Bay, Nfld., southw. to B.C. and Mich., and in the mts. to N. Mex.

17b. **S. graminifolia,** var. **Nuttallii** (Greene) Fernald.

Sea beach (Bon.).

(Boreal-)temperate eastern American: Minn. to Nfld., southw. to Tenn. and N.J.

38. CONYZA L.

1. **Conyza canadensis** (L.) Cronquist. [T] (*Erigeron canadensis* L.; *See* Cronquist, Bull. Torrey Bot. Club 70: 629-632. 1943.) Horseweed

Dry fields (Bic; Lou.; Drt.; Gpe.; New Carlisle; Car.).

Boreal American: throughout N.A. except in the extreme North; now widely distributed throughout the world.

39. ERIGERON L.
(Fleabane)

[Cronquist: Revision of the North American species of Erigeron, north of Mexico; Brittonia 6: 121-302. 1947.]

- a. Stems leafy, the leaves entire or merely toothed.
  - b. Pistillate corollas very numerous, filiform, with very narrow, short, erect ligules little exceeding the copious pappus.
    - c. Peduncles and involucres more or less glandular; peduncles stiffly ascending-spreading or more or less arcuate; heads several or many; plant mostly 3-8 dm. high..1. *E. acris,* var. *asteroides*
    - c. Peduncles and involucres nearly or quite glabrous; peduncles more erect; heads solitary or few; plant mostly 1-4 dm. high...............1a. *E. acris,* var. *elatus*
  - b. Pistillate corollas few to numerous, the tube generally cylindrical, the ligules well developed and spreading, or occasionally reduced and absent.
    - c. Leaves narrowly linear, entire; branches prolonged into slender naked peduncles bearing solitary heads; stems slender, densely tufted, from filiform rootstocks..2. *E. hyssopifolius*
    - c. Leaves, at least the basal ones, not linear; plants with fibrous roots.
      - d. Rays very numerous, purplish or violet-colour; upper leaves cordate-clasping, crenate, dentate, or subentire; stem and leaves more or less pubescent with long spreading hairs....................................3. *E. philadelphicus*
      - d. Rays fewer, white; leaves entire or nearly so, not clasping; stems sparingly hispidulous or nearly glabrous..............4. *E. strigosus,* var. *septentrionalis*
- a. Stems scapiform, the leaves crowded at the base, ternately lobed or dissected, the cauline leaves few and reduced, mostly entire; heads solitary, the disk 8-20 mm. wide; ligules white, pink, or blue (sometimes wanting); foliage and involucre more or less glandular, sparingly to densely pubescent; plant perennial from a stout caudex..5. *E. compositus*

1. **E. acris** L., var. **asteroides** (Andrz.) DC. [Hs] (*E. elongatus* Ledeb., *See* Fernald, Rhod. 40: 344-347. 1938; *E. angulosus,* var. *kamtschaticus* Hara, Rhod. 41: 389. 1939.)

Calcicole: sea cliffs (Ros.); river gravels (Ann.; PCa.); dry calcareous sand above beach (Car.); habitat not stated (Bic; Mét.; Gro.; Trl.; Marsouins; Prr.; Lou.; Pcé.).

Boreal circumpolar: Alaska, Yukon, Mack. (Great Bear L., Great Slave L.), Man., Hudson Bay (Port Nelson), s. Que. (Lake St. John), and s. Lab., southw. to n. Oreg., n. Utah, Colo., the Great Lakes, and Me.; n. Eurasia.

1a. **E. acris,** var. **elatus** (Hook.) Cronquist. (*E. elatus* Greene; *E. acris,* var. *oligocephalus* Fern. & Wieg., Rhod. 12: 226. 1910; *E. acris,* var. *arcuans* Fern., Rhod. 28: 236. 1926; *E. elatus,* var. *oligocephalus* Fernald, Rhod. 40: 347. 1938.)

Calcicole: river gravels (Ann.; Drt.).

Boreal American: Alaska, Yukon, Mack. (Mack. R. Delta, Great Bear L.), n. Sask., middle Hudson Bay (w. and e. coasts), s. Lab., and Nfld., southw. to B.C., Alb., Sask., Man., James Bay, and Gaspe.

2. **E. hyssopifolius** Michx. var. **typicus** Cronquist, Brittonia 6: 276. 1947. [Hpr.]

Calcicole: river ledges and gravels (Bic; Rim.; Mtn.; Cap Chat; Ann.; Cld.; Mad.; Ren.; Drt.; Portage; Gnd.; Pab.; Bon.; PCa.; GCa.; Mat.; Res. (type station for var. *typicus*)); sea cliffs (Pcé.); calcareous alpine meadow (Tbl.); dry alpine schists (Log.).

Boreal American, alpine: Mack. (Great Bear L., Great Slave L.), n. Sask., Keewatin, James Bay, Lab., and Nfld., southw. to B.C., Alb., Sask., Man., the Great Lakes, Me., and Vt.

Var. *typicus,* forma *patens* Cronquist, with the hairs spreading nearly or quite to the top of the stem (Brittonia 6: 276. 1947), has been collected from ledgy banks of Matapedia River.

3. **E. philadelphicus** L. [Hsr]

Fields (Bic; Mét.; Mtn.; Ann.; Tng.; Pcé.; Drt.; Yrk.; GCa.; Mat.; Irn.); river gravels (Bon.; PCa.; Mat.). General.

Boreal American: Mack., B.C., Alb., Man., Wis., s. Lab., southw. to Calif. and Fla.

4. **E. strigosus** Muhl., var. **septentrionalis** (Fern. & Wieg.) Fern., *See* Rhod. 44: 340. 1942. [T] (*E. ramosus,* var. *septentrionalis* Fern. & Wieg., Rhod. 15: 60. 1913.)

Boggy meadow (Bic); bare rocks (Bic); roadside (Val d'Espoir); dry open soil (Dou.) (paratype station); habitat not stated (Gpe.; New Carlisle; Nou.).

(Boreal-)temperate American: Sask. to Nfld., southw. to Calif., Ark., and Me.; more northern than the species.

5. **E. compositus** Pursh. [Ch (semi-shrubby)] (*See* Fernald, Rhod. 50: 238-240. 1948.)

Calcicole: sea cliffs (Bic; Trl.; Prr.; Lbn.; For.; Pcé.).

Arctic American (alpine): Alaska, Yukon, Mack. (Mack. R. Delta, Great Bear L., Coronation Gulf), Banks I., Victoria I., Melville I., Keewatin, Ellesmere, e. Que., southw. in the mts. to Calif., Nev., Utah, and Colo.; w. and e. Greenland.

The Quebec material is referred by Cronquist to var. *glabratus* Macoun (var. *multifidus* Macbr. & Pays.), although with reference to var. *discoideus* A. Gray (var. *trifidus* A. Gray; var. *trifidus,* forma *discoideus* Vict. & Rousseau) he says "Probably in Quebec, but all the collections I have seen from there are either var. *glabratus* or somewhat intermediate". Fernald (Rhod. 30: 122 (footnote). 1928) identified the Gaspe plants of Mont St. Alban and Mont St. Pierre with the arctic extreme (var. *trifidus,* lated (Rhod. 50: 238. 1948) reducing it to var. *discoideus* Gray, forma *trifidus* (Hook.) Fern.). According to Victorin and Rousseau (Contr. Inst. Bot. Univ. Montréal, No. 36: 61-63. 1940), certain of the forms into which the species is divisible are doubtless the result of ecological reaction. Thus, plants of Bic, which in their natural habitat approached var. *typicus*, reappeared as var. *trifidus* after a year of cultivation at the Montreal Botanical Garden. Again, certain of the Bic plants that appeared intermediate between var. *typicus* and var. *multifidus*, appeared after cultivation to be allied to var. *trifidus*. They concluded that the identification of varieties and forms of the plant without preliminary cultivation was a rather problematical procedure. Dansereau (Naturaliste Canadien 64: 121-126. 1937) believes the Percé plant to be referable to var. *typicus*. According to Cronquist, "*Erigeron compositus* is a highly variable and unstable species. The degree of development of the ligules and the amount of pubescence are conspicuously variable features but are taxonomically worthless."

40. ASTER L.

(Aster)

a. Pappus double, the inner of long capillary bristles, the outer of very short and rigid bristles; bracts of the involucre without green tips, the greenish midrib not dilated towards the apex; rays white; heads very numerous in compound flat corymbs; leaves lanceolate, taper-pointed, tapering at the base................1. *A. umbellatus*

a. Pappus simple.

b. Basal leaves cordate and petioled.

c. Inflorescence viscid-glandular; rays violet; involucre 3-4 seriate, the bracts greenish, blunt, pubescent; basal leaves large.

d. Stem glandular, most of its leaves cordate, the upper leaves oblong, with broadly winged petioles...................................2. *A. macrophyllus*

d. Stem villous-pubescent; leaves pilose beneath, all but the lowest truncate or tapering to a slender petiole................2a. *A. macrophyllus*, var. *velutinus*

c. Inflorescence not glandular; basal leaves similar to the cauline.

d. Involucres 3·6-5·2 mm. high; disks 3-5 mm. across; inflorescence racemose-paniculate, the peduncles equal or grading uniformly in size....3. *A. cordifolius*

d. Involucres 5·2-8·2 mm. high; disks 4·5-7·5 mm. across; inflorescence corymbose-paniculate, the peduncles or ultimate branches very uneven in size..4. *A. ciliolatus*

b. Basal leaves cordate and petioled.

c. Stem-leaves not clasping.

d. Bracts of the involucre with green tips, the green midrib dilated towards the apex.

e. Basal leaves with definite margined petioles; leaves lanceolate, pointed, very rough on both sides and rugose-veined, entire or somewhat serrate...5. *A. radula*

e. None of the leaves definitely petioled.

f. Involucre 5 mm. high or less; heads in more or less 1-sided racemes; leaves lanceolate or oblong-lanceolate, tapering or pointed at both ends, sharply serrate in the middle..........................6. *A. lateriflorus*

f. Involucre more than 5 mm. high; leaves linear or linear-lanceolate, entire or almost so.

g. Involucral bracts imbricated in several series, the outer ones short; leaves scabrous on the margins......................7. *A. junciformis*

g. Involucral bracts equal or subequal, the outer ones foliaceous, 10-12 mm. long; leaves ciliate-hispid on the margins................8. *A. gaspensis*

d. Bracts of the involucre without green tips; achenes pubescent; rays white or purplish; leaves thin, broadly oblong, acuminate, narrowed to a somewhat cuneate sessile base, sharply and coarsely dentate, pubescent at least on the veins beneath; stems pubescent or puberulent, zigzag, often leafless below..9. *A. acuminatus*

c. Stem-leaves with clasping base.

d. Bracts of the involucre distinctly imbricated, the tips squarrose or recurved-spreading; rays blue-violet; plants often maritime, more or less fleshy.

e. Bracts linear, acute, somewhat spreading; leaves firm, acuminate, 5-12 cm. long, 6-16 mm. wide; plants slender, 3-10 dm. high.........10. *A. novi-belgii*

e. Bracts in several loose rows, all but the innermost with broadish obtuse tips, the outer usually spatulate; leaves shorter, broader, thickish, acute, 3-6 cm. long; plants low and spreading, rigid......10a. *A. novi-belgii*, var. *litoreus*

d. Bracts of the involucre in only 1 or 2 series.
  e. Bracts linear or oblong, green; stems usually stout, reddish, hispid-pubescent over the surface..................................11. *A. puniceus*
  e. Bracts foliaceous, oblong, the inner narrower and acute; stems stout or slender, glabrous or pubescent above in lines................12. *A. foliaceus*

1. **A. umbellatus** Mill. [Hpr] Flat-top Aster

River gravels (Pab.; Bon.; Mat.); sea cliffs (Pcé.; Bon. I.); roadside (Bic); clay bank (Fla.); woods and thickets (Bic; Rim.; Grand Lac Matane; Drt.; Car.; St. Tharsicius). General.

(Boreal-)temperate American: Sask. to s. Lab. and Nfld., southw. to Iowa and Ga.

2. **A. macrophyllus** L. [Hsr] Bigleaf Aster

Sea ridges (Bic); river banks (Mat.); woods and clearings (Rim.; Val d'Espoir; New Carlisle; Car.). General.

Temperate eastern American: Minn. to e. Que., southw. to N.C.

2a. **A. macrophyllus,** var. **velutinus** Burgess.

Rocky slopes (Tra.); woods (Bic; Cap Chat; PCa.).

Range of the species.

3. **A. cordifolius** L. [Hsr] Blue Wood Aster

Sea cliffs (Tra.); river gravels (Mat.); thickets (New Carlisle).

Temperate eastern American: Minn. to e. Que., southw. to Mo. and Ga.

4. **A. ciliolatus** Lindl. [Hsr] (*A. Lindleyanus* T. & G.)

Sea cliffs (Pcé.; Car.); river gravels (Pab.; Mat.); dry hillside (Gnd.); thickets (Jhn.; Dou.; God.); habitat not stated (Lou.; Drt.; PCa.).

Boreal American: Yukon, Mack. (Great Bear L., Great Slave L.), Lab., southw. to Wyo., Ohio, and N.H.

5. **A. radula** Ait. [Hpr]

Damp woods (Drt.; Newport); wet field (Dou.); brackish marsh (Newport).

(Arctic-)boreal eastern American: Hudson Bay to n. Lab. and Nfld., southw. to N. Eng.

6. **A. lateriflorus** (L.) Britton. [Hsr] Small White Aster

Habitat not stated (Rim.).

Temperate eastern American: Que., N.S., and P.E.I., southw. to Ind., Pa., and Conn., and in the mts. to N.C.

7. **A. junciformis** Rydb. [Hp] (*A. junceus* of Gray's Man., ed. 7, not Ait.)

Cedar swamps (New Carlisle; Bon.); damp meadow (Nou.); brackish marsh at river mouth (Bon.); habitat not stated (Gnd.).

Boreal American: s. Alaska, s. Yukon, and Mack. to e. Que., southw. to Colo., Ohio, and N.J.

8. **A. gaspensis** Victorin, Contrib. Lab. Bot. Univ. Montréal, No. 20: 3. 1932. [Hpr]

Calcicole: river ledges and gravels (Gnd.; Pab.; Grand Pabos; Bon.).

Gaspe endemic: eastern representative of the western section *Fulcrati*.

Forma *albiflora* Victorin, with white ligulate florets, has been described from the above area (Naturaliste Canadien 171: 209. 1944).

9. **A. acuminatus** Michx. [Hpr]

Woods (Bic; Rim.; Mtn.; Cap Chat; Cld.; Lac à Claude; Prr.; Pcé.; Drt.; PCa.; Tra.). General in its habitat.

Boreal eastern American: Ont. to Lab. and Nfld., southw. to Pa., and in the mts. to Ga.

10. **A. novi-belgii** L. [Hpr]

River gravels (Jhn.; Mat.); sea beach (Bic; Mtn.; Ann.; Pcé.; Car.); bog (Bon.); damp slopes (Lou.).

(Boreal-) temperate eastern American: e. Que. to Nfld., southw. to Ga.

10a. **A. novi-belgii,** var. **litoreus** Gray.

River gravels (Ann.; Mat.); sea beach (Anse Jersey); habitat not stated (Lac du Club).

Range of the species.

11. **A. puniceus** L. [Hpr] Purple-stem Aster

Woods, thickets, and swampy soil (Bic; Rim.; Gpe.; Dou.; Pcé.; Pab.; Dan.; Mar.; Nou.); alpine and subalpine woods and slopes. (Tbl.; Log.; Pem.; Ftn.).

(Boreal-) temperate American: n. Alb. (Wood Buffalo Park) to Nfld., southw. to Tenn. and Ga.

Included above are specimens referred to var. *firmus* (Nees) T. & G., var. *oligocephalus* Fernald, and var. *perlongus* Fernald. In view of the present unsatisfactory status of these forms (*See* Shinners, Rhod. 45: 349. 1943), no attempt is made here to dispose of them individually.

12. **A. foliaceus** Lindl. [Hpr] (*See* Fernald, Rhod. 17: 13-14. 1915.).

Sea cliffs (Trl.; Prr.; Pcé.); river gravels (Drt.; Yrk.; Jhn.; Gnd.; Dan.; Bon.; PCa.; GCa.; Pab.; Mat.); edge of ponds (Bic; Lac du Club); peaty headlands (Ren.; Pcé.; Cha.); woods (Cap Chat); calcareous alpine meadow (Tbl.).

Alpine serpentine barrens (Alb.).

Disjunct American, alpine: Aleutian Is., Alaska, Mack.; Great Lakes region; e. Que. to Lab., southw. to N.H.; representative of the western section *Foliosi*.

Included above are specimens referred to var. *frondeus* Gray, var. *arcuans* Fernald, var. *crenifolius* Fernald, and var. *subpetiolatus* Fernald. In view of the complexity of the group (*See* Shinners, Rhod. 45: 348-349. 1943), no attempt is made here other than to treat it as a broad species. *See also,* Fernald in Rhodora 51: 96-99. 1949.

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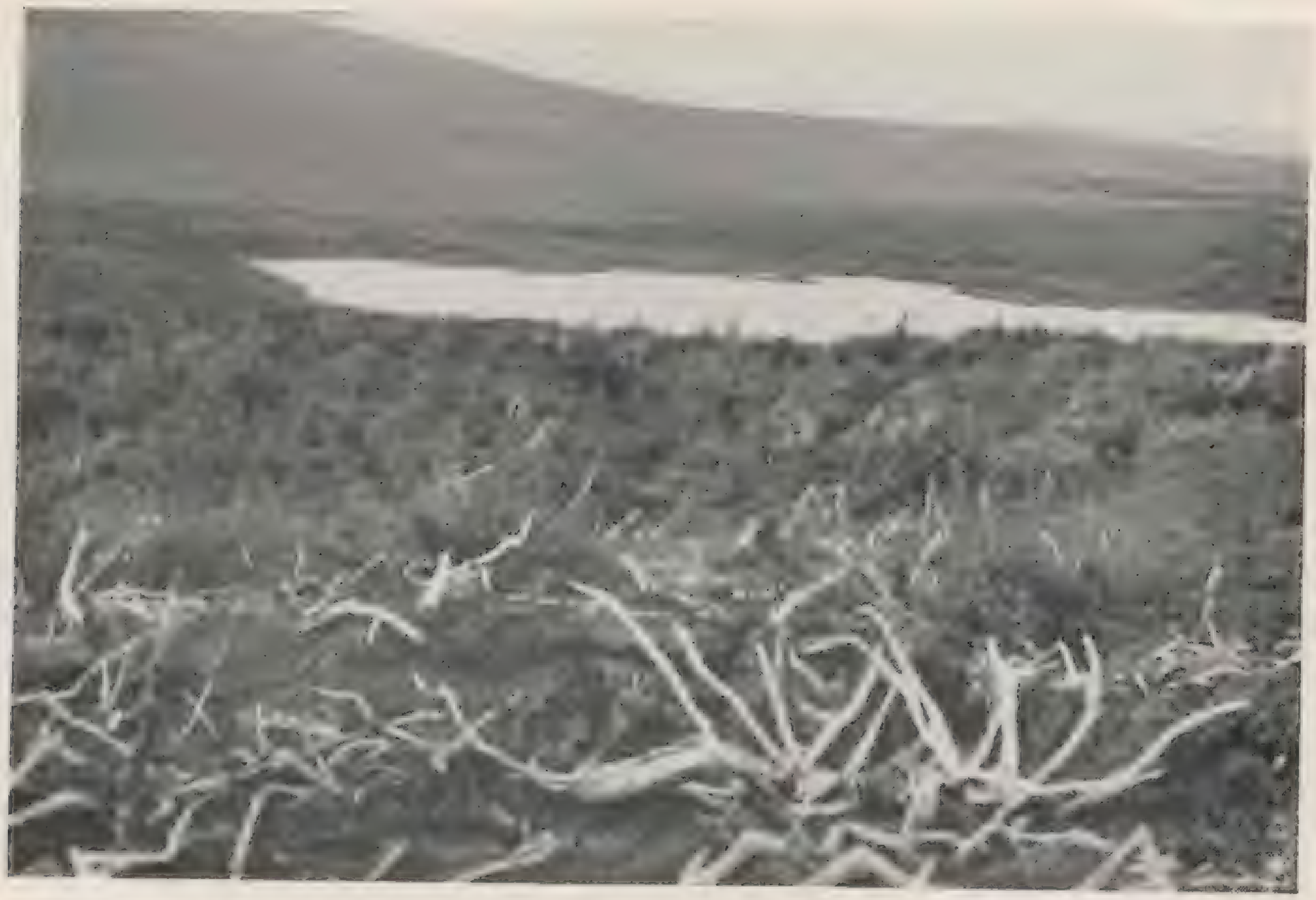
A. Mont Jacques Cartier ("Botanist's Dome") of the Tabletop Range; the highest point of the Gaspe Peninsula (elevation 4,230 feet).

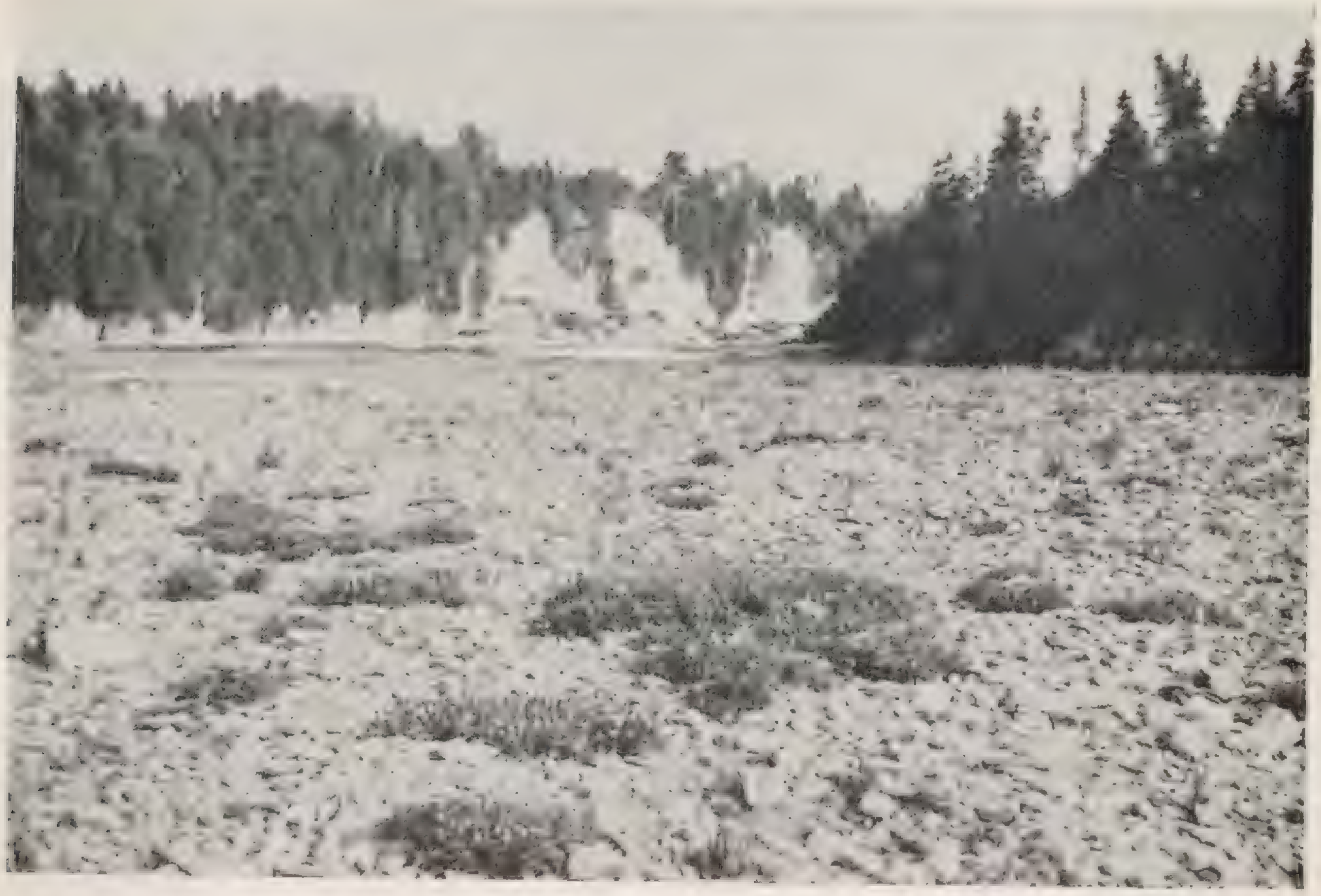
B. Limestone walls of glacial cirque, Lac des Américains, Tabletop Mountain. Photo by F. J. Alcock.

A. Serpentine tableland of Mount Albert, showing amphibolite ridge and North Peak (altitude 3,554 feet), in background.

B. Devil's Gulch (Coulée du Diable) in serpentine batholith, east side of Mount Albert.



A. Mount Albert plateau, showing serpentine barrens (background) and spruce "krummholz" (foreground).



B. Cobble flood-plain near mouth of Grand River (Grande Rivière); circular mats of *Dryas Drummondii* in foreground, limestone cliffs in background.

PLATE V

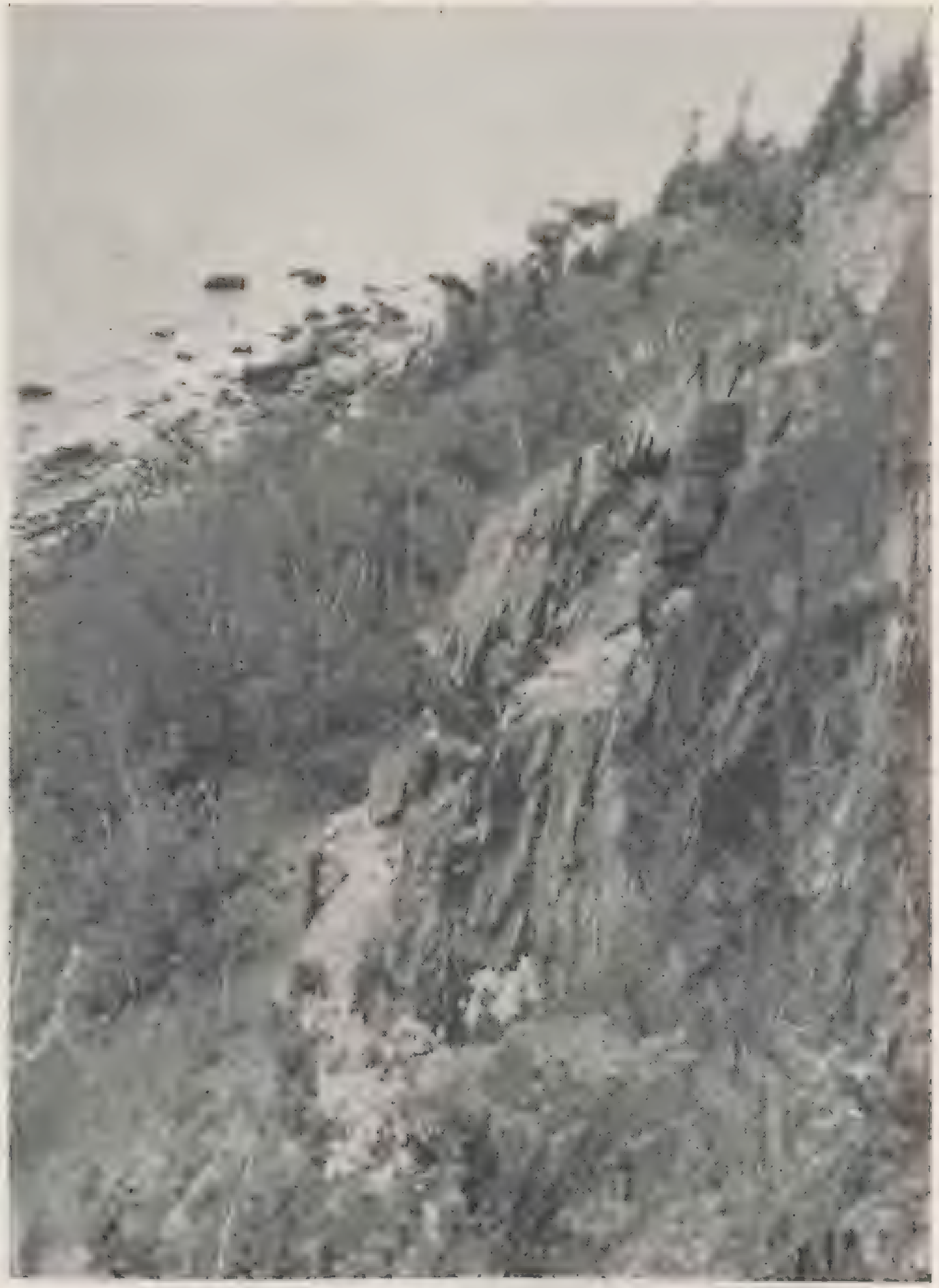
A. Limestone sea cliffs and talus, Cap Bon Ami, Forillon Peninsula.

B. Limestone cliffs above Lac Pleureuse.

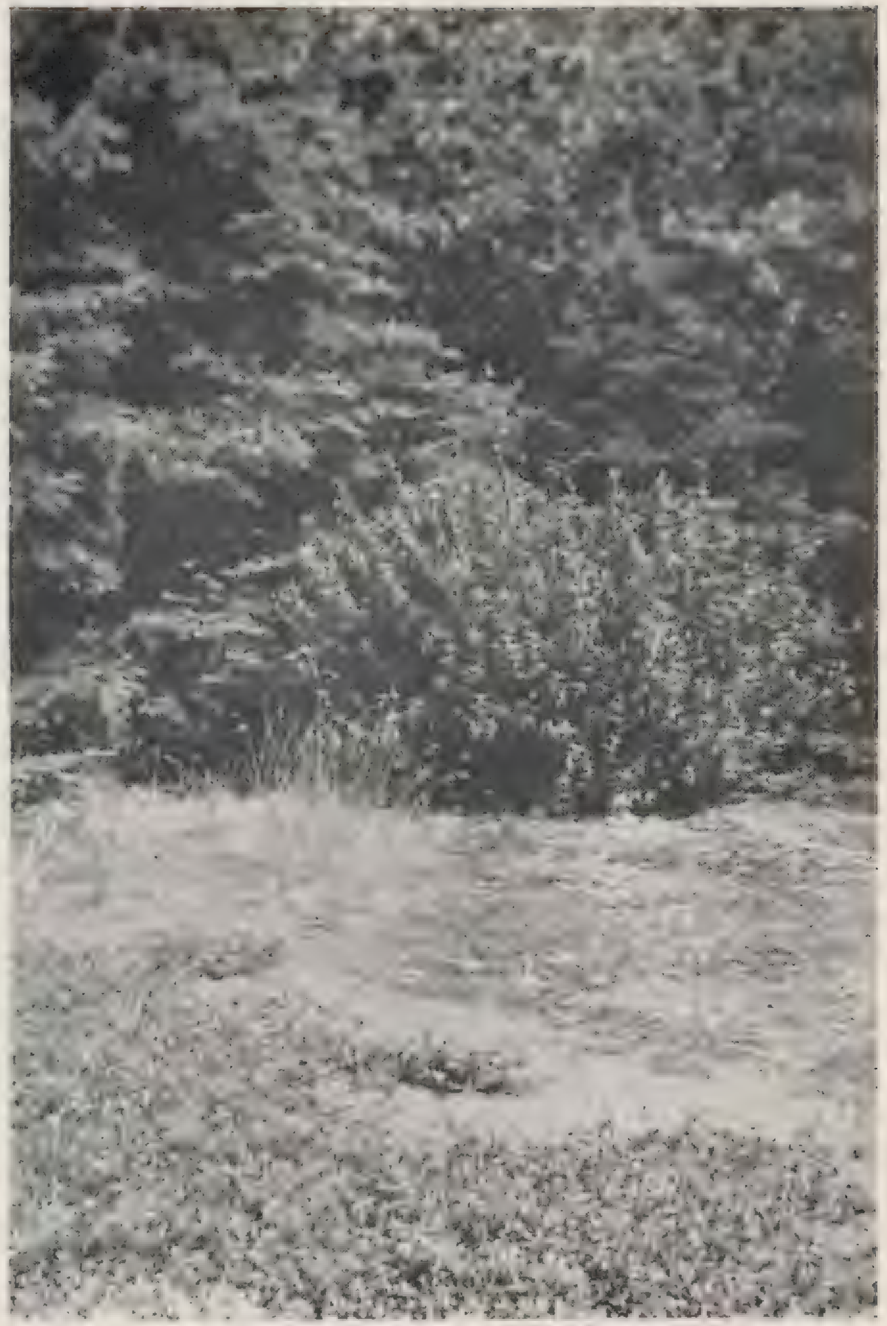
A. Mont St. Pierre, showing sea cliffs and talus slope near sea-level, and denuded summit.

B. Slope near summit of Mont St. Pierre, showing extensive station of *Elaeagnus commutata*.

PLATE VII

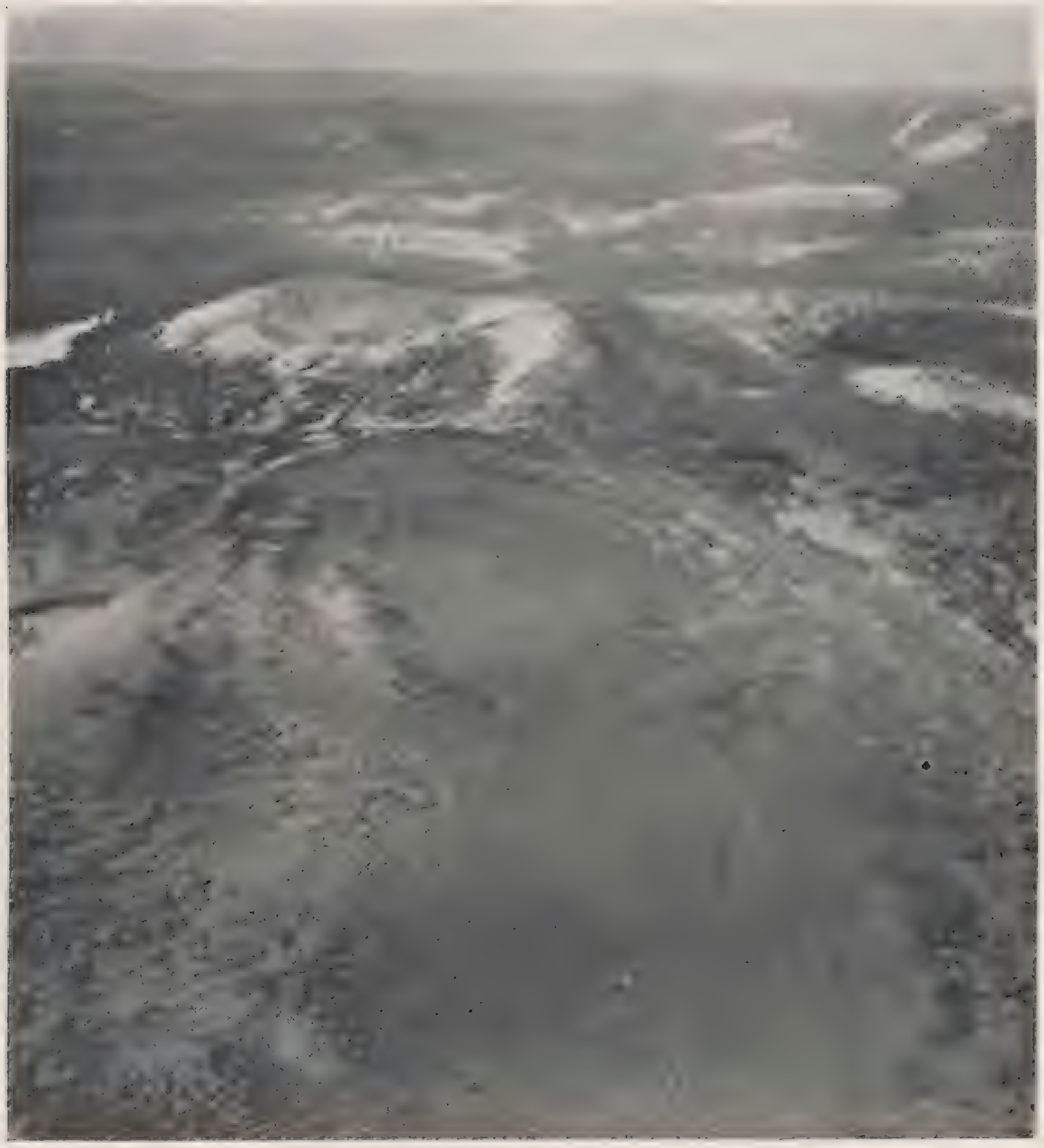


A. Slaty calcareous sea cliffs near Cap à l'Orignal, Bic; *Elaeagnus commutata* in foreground.



B. Dry headland of slaty sand, Michaud Point, Cap à l'Orignal, Bic.

PLATE VIII



Tabletop Range, Gaspe Peninsula; Mont Jacques Cartier ("Botanist's Dome"). (*Aerial photo, courtesy Department of National Defence, Ottawa, Canada.*)

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